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No. 5.—HELMINTHS OF ECONOMIC IMPORTANCE IN FARM ANIMALS, EXCLUDING POULTRY*

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I trust that the following paper may be considered a satisfactory interpretation of the wishes of the Provisional Committee. I have tried to avoid platitudes, but I fear the result is a review rather than any addition to our knowledge. I hope, however, that it will provoke a good discussion.

"Helminths" are parasitic trematodes, cestodes, and nematodes. The conception of "economic importance" depends upon the outlook of the stock owner and the food inspector and the knowledge of the veterinary surgeon. It will vary with time and circumstance. The death of a flock of sheep is serious and obvious; the constant condemnation of worm-infested lungs or livers over the whole country for years is hardly noticed. A worm, known to cause great losses abroad, being rare here, may be a latent danger. The possibility of man becoming infected from an animal source may give a parasite an added importance. *Tænia cœnurus* may be almost negligible in a town fox-terrier, yet in a foxhound exercising on a sheep-run, it may cause a veritable outbreak of "gid." A worm affecting several hosts may be noteworthy, but in a single species hardly worth mentioning. "Farm animals," for the purpose of this paper, will be horses, cattle, sheep and swine in the British Isles; any of these not kept under farming conditions will be excluded. It will be disputed for some districts and some hosts that I have omitted important worms, included trivial ones, or perhaps have not described essential aspects. It seems to be accepted that it is desirable to control diseases of livestock by every possible means; on the other hand, there appears to be no plan or plans to get the stock owner or veterinary surgeon to put into practice all we know to-day concerning worm infestations. The importance of parasitology has gradually forced itself to the attention of the veterinary profession. Our graduates ought to be so trained that they can point out the way to the stock owner. The Royal College of Veterinary Surgeons has laid it down under the five years' syllabus that after 90 hours instruction in protozoology, helminthology, entomology and the methods of clinical parasitology, there shall be a written examination of two hours, and an oral and practical test of one hour.

Good teachers, experienced in morphology and field work, ought to lift the subject to the position it so rightly deserves. It has too long been shuttlecocked from zoologist to pathologist, and back to lecturer on medicine. There are now journals devoted to the subject in most languages. There are works on morphology and on anthelmintics. There is an Imperial Institute of Parasitology; a helminthologist at the British Natural History Museum, at the Ministry of Agriculture and Fisheries, at the Universities of Edinburgh and Liverpool; and even then the list is not exhausted.

It would seem to me to be safest to regard all parasitic worms as injurious until the contrary has been proved. The reverse policy appears to be more general; it is often said that there is no experimental evidence to show that a given parasite is pathogenic. In some cases the life history of the worm may be unknown, and experimental animals, such as horses and cattle, may be very costly. Clinical experience is, however, sometimes not very reliable. There are several worms which were formerly said to be of little pathogenic importance, but which are now regarded as being extremely so, because their wanderings in the body, before reaching the adult stage, are now known. Regarded in this light, the term "economic importance" becomes extremely wide.

When called to treat one or more animals suffering from helminthiasis, it is essential to consider the whole herd or flock, and owners must be made alive to the importance of putting into force vigorous preventive measures. It has been said, with considerable reason, that parasitic diseases are increasing on account of intensive methods and because stock owners cannot afford to treat or control them. A worm-infested animal should be regarded in the same light as one affected with a microbic disease, save for those modifications suggested by helminthology. It should be the aim of the veterinary practitioner to indicate to stock owners those principles which must be incorporated into all systems of animal management, breeding and farming, in order to reduce and control worm infestations.

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DEPT. OF VET. MEDICINE

Although a few surveys in some districts, and isolated reports and opinions have been published, there is little information as to the prevalence, distribution, and economic importance of most of the common parasites. Something is known of equine strongylosis, of bovine husk, of ovine parasitic gastro-enteritis, of fascioliasis of sheep, and of ascariasis of swine; but what of all the other worms? The following table gives a rough idea of the numbers of world-wide distinct species of trematodes, cestodes and nematodes recorded from farm animals:—

Table I.

	Horse.	Ox.	Sheep.	Pig.
Trematodes ...	8	20	15	17
Cestodes (adult & cystic stage) ...	9	11	12	7
Nematodes ...	64	52	47	31
Totals ...	81	83	74	55

Table II contains the names of the species which are considered to fall within the scope of this paper.

Table II.

	Horse.	Ox.
Trematodes		*Fasciola hepatica*
Cestodes	*Anoplocephala perfoliata*	*Tænia granulosa* (cysts)
	Tænia granulosa (cysts)	*cœnurus* (cysts)
Nematodes	*Parascaris equorum*	*Hæmonchus contortus*
	Strongylus edentatus	*Trichostrongylus axei*
	equinus	*Ostertagia ostertagia*
	vulgaris	*Cooperia oncophora*
	Triodontophorus brevicauda and other species	*Nematodirus filicollis*
		Œsophagostomum radiatum
	Trichonema insigne and other species	*Bunostomum phlebotomum*
	Oxyuris equi	*Chabertia ovina*
	Onchocerca cervicalis	*Trichuris ovis*
		Dictyocaulus viviparus

	Sheep.	Pig.
Trematodes	*Fasciola hepatica*	*Fasciola hepatica*
Cestodes	*Moniezia expansa benedeni*	*Tænia granulosa* (cyst)
	Tænia granulosa (cyst)	
	cœnurus (cyst)	
Nematodes	*Hæmonchus contortus*	*Ascaris lumbricoides*
	Ostertagia circumcincta and other species	*Œsophagostomum dentatum* and other species
	Trichostrongylus axei and other species	*Hyostrongylus rubidus*
		Trichuris trichuria
	Nematodirus filicollis and other species	*Metastrongylus elongatus*
		salmi
	Cooperia oncophora and other species	*Chœrostrongylus pudendotectus*
	Œsophagostomum columbianum and other species	*Trichinella spiralis*
	Chabertia ovina	
	Bunostomum trigonocephalum	
	Trichuris ovis	
	Dictyocaulus filaria	
	Muellerius capillaris	
	Protostrongylus rufescens	

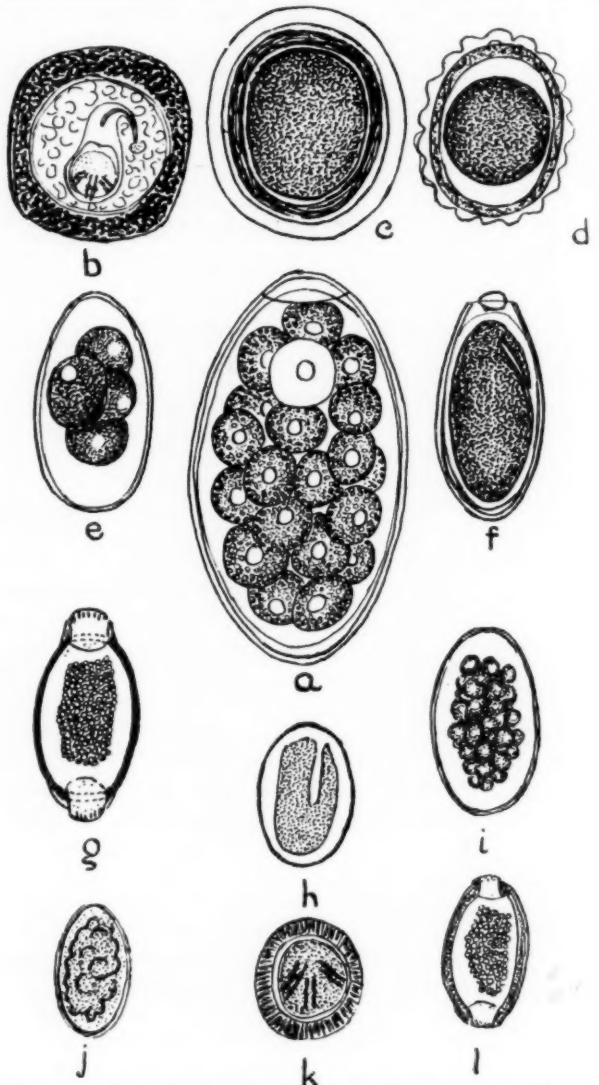

Fig. 1.—Eggs of some Parasitic Worms of Farm Animals.

(*a*) *Fasciola hepatica* (140 × 80 μ); (*b*) *Anoplocephala perfoliata* (70 μ); (*c*) *Parascaris equorum* (90 μ); (*d*) *Ascaris lumbricoides* (80 × 50 μ); (*e*) *Strongylus sp.* (90 × 50 μ); (*f*) *Oxyuris equi* (90 × 40 μ); (*g*) *Trichuris sp.* (75 × 35 μ); (*h*) *Strongyloides sp.* (50 × 25 μ); (*i*) *Œsophagostomum sp.* (70 × 40 μ); (*j*) *Hyostrongylus rubidus* (45 × 35 μ); (*k*) *Tænia sp.* (30 to 50 μ); (*l*) *Capillaria sp.* (50 × 25μ).

The practitioner ought to be able to identify most of these after a little practice with the aid of a book[1] or two,[2] a microscope and a few simple methods. Neither should it take long to become familiar with the eggs of a fluke, a tapeworm, an ascaris, a strongyle, a trichurid and an oxyurid. They can easily be obtained by splitting open the middle third of an adult egg-producing worm. Fig. 1 shows a number of eggs in outline.

When this has been accomplished, an attempt at diagnosing by means of one of the flotation methods can be made. That of Sheather[3] is quite satisfactory. For operculated eggs, sedimentation is necessary. After a while, and

always with the same technique, one can correlate the microscopic findings with the clinical picture, but for more exact work figures and weights are necessary.

The microscopical examination of films of fæces is extremely interesting, and presents problems of unending diversity and perplexity. Allied to microscopical and morphological diagnosis there are a number of other procedures which should receive passing mention. None of the dermal, intradermal, or conjunctival reactions have yet reached such a stage as to be employed in everyday veterinary practice, but quite a high degree of accuracy has been obtained in this direction in the diagnosis of Trichinellosis and Echinococcosis of man. Blood smears may give additional evidence in clinching a doubtful diagnosis by showing the presence of eosinophilia. Marek[4] gives the following percentage figures of the normal eosinophiles among leucocytes: horse, 2 to 4; cattle, 8; young cattle and calves, ·5 to 3; sheep, 8 to 26; pig, ·75 to 8.

With regard to clinical diagnosis, it has to be admitted that very often the disease is firmly established before its presence is determined. The cardinal signs, anæmia, diarrhœa, and emaciation in herded animals, are end results. A ragged and soiled flock, a half-starved bunch of arch-backed stirks, a stunted litter of store pigs, and badly-doing hairy-bellied colts are typical pictures indicating a policy of drift. In order to try and prevent this state of affairs, parasitism should always be suspected until it is excluded. If weight for age is below the average, it may be due to worm infestation. From the premises alone it is often possible to form a useful opinion that parasitic disease is likely to be present. Alleged sudden deaths and pictures of nervous symptoms are not without importance when one is called in early. Fits in pigs, under certain circumstances, may be diagnostic of ascaris invasion. Thick legs and swellings under the chest and abdomen may be the first indication of strongylosis in colts grazing on a marsh. I have often wondered how many cases of parasitism (deaths and nervous cases) are yearly thought to be due to lightning stroke. In the cart stable, the commonest causes of unsatisfactory condition are itchy legs, periodontal disease, and strongylosis. All three may co-exist.

With such a formidable table of worms of economic importance, it will not be expected that I should discuss all of them in detail or try to justify the inclusion of them all. Many of them are well known, even if unrecognisable under some of the older names. Their injurious effects are seen in the field, in the abattoir, and at *post-mortem* examinations. A few words of explanation concerning the lists given for each host may, however, be desirable. In the horse, there appears to be an increasing interest in the tapeworm, *Anoplocephala perfoliata*, and every year I receive accounts where it is blamed for causing symptoms. Echinococcosis is sometimes quite prevalent in the livers of horses slaughtered for export. There is an increasing tendency to regard *Onchocerca cervicalis* as of some etiological importance in the production of

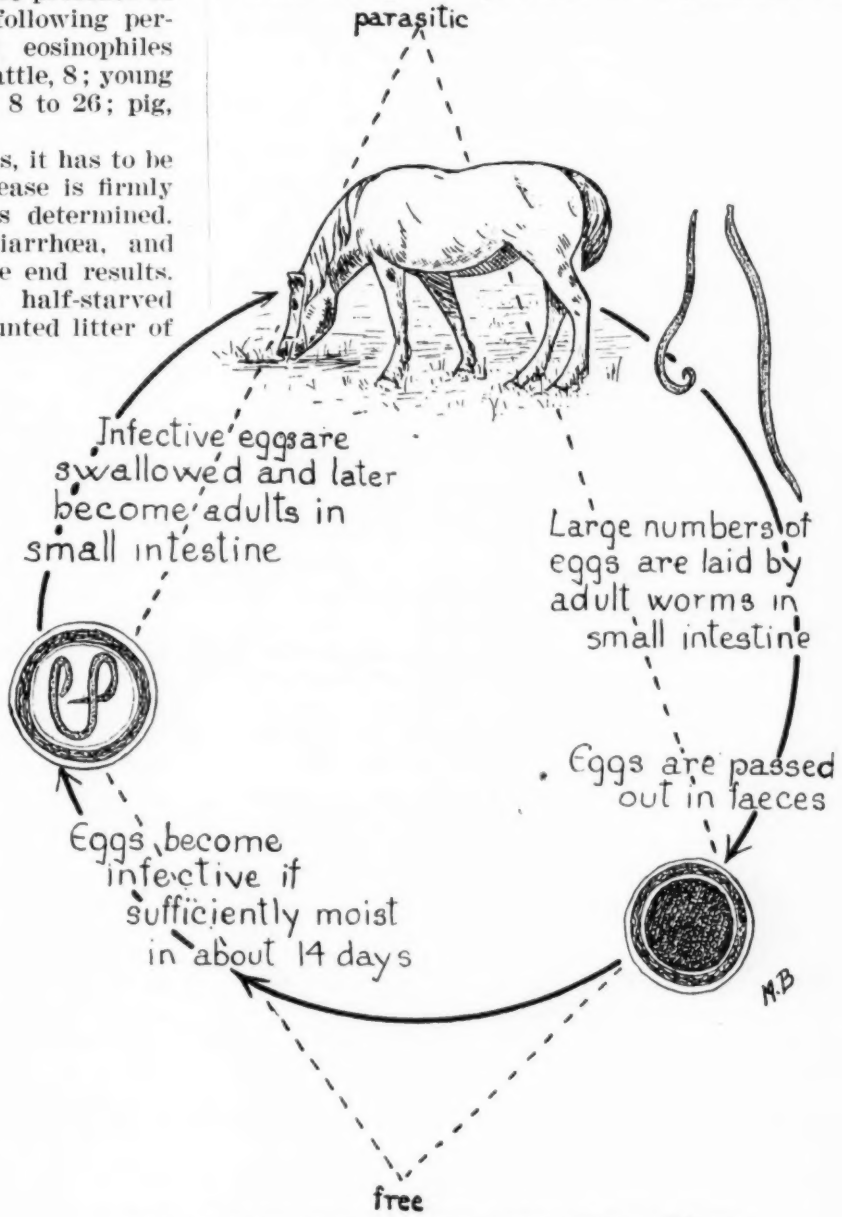
parasitic
Infective eggs are swallowed and later become adults in small intestine
Large numbers of eggs are laid by adult worms in small intestine
Eggs are passed out in faeces
Eggs become infective if sufficiently moist in about 14 days
free
M.B

Fig. 2.—Life Cycle of the Large White Worm (*Parascaris equorum*) of the Horse.

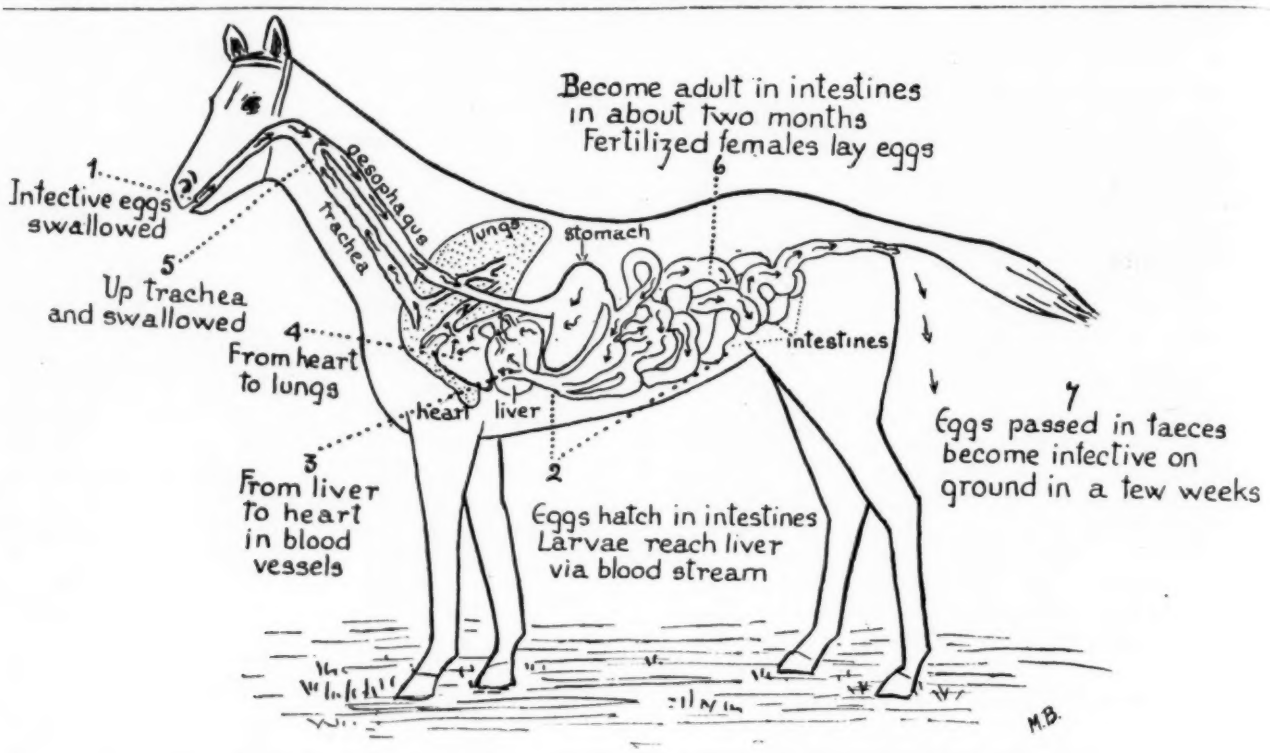

Fig. 3.—The Route taken by *Parascaris equorum* within the Host.

poll evil and fistulous withers. I am satisfied that *Oxyuris equi* is sometimes of considerable importance in neglected stables. There are several other genera allied to *Trichonema* which, for brevity's sake, have not been mentioned. With regard to the list from the ox, it is well to emphasise the fact that *Fasciola hepatica* is a common cause of lesions and clinical symptoms. It may be speculated with interest as to the relation of these lesions to the escape of poisons into the ox's system, resulting from loss of the toxin-destroying function of the liver. In some areas " gid " of cattle is likewise a bovine condition demanding attention. The bunostomes, *B. trigonocephalum* of sheep, and *B. phlebotomum* of cattle behave like other hookworms and produce, when in sufficient numbers, a marked anæmia. Unlike most other nematodes, of ruminants, the larval stage appears to enter the host by way of the skin. The only other nematode worthy of special mention in the list relating to sheep is *Chabertia ovina*, which for years has been regarded as a vegetable feeder. Several investigators have lately, however, described a chabertiosis. The inclusion of *Trichinella spiralis* in the list of the pig, is not to suggest that it causes heavy infection of man at present. Human cases do occur in this country, and it is well to be reminded of them.

I cannot here discuss the manner in which helminths produce their injurious effects, but it is important to realise that they may be an accessory factor to the invasion of the tissues by bacteria. Such is the case in infectious necrotic hepatitis of sheep in Australia, where *Bacillus œdematiens* multiplies in the localised areas of necrosis caused by the wandering immature fluke.[5]

The diagrammatic representation of the life-story of a parasite within and without the host is of considerable value, and can be made impressive in explaining points to owners of live-stock. Figs. 2 and 3 refer to the large white worm of horses (*Parascaris equorum*).

Here it is clear that the eggs get into food and water (pasture or stable), and in about a fortnight are infective. In the host the eggs, after being swallowed, hatch into larvæ in the intestine, and these journey by the blood to the liver, heart and lungs, thence by way of the trachea, larynx, pharynx and œsophagus to the stomach and intestine, where they become adults, the females of which are fertilised, and shed eggs, which pass out in the fæces—a damaging journey, especially in foals. In this disease there is a suggestive clinical picture, a reliable method of diagnosis, and a good treatment. It remains to enforce a simple yet effective means of prevention in order to control this worm. This will be based on treating affected animals, destroying the voided worms, foaling in a well-scalded and white-washed box, and grazing in a paddock which has had a long rest from carrying horses or horse manure. If it is too much trouble to put these measures into force, it is unreasonable to complain of damage due to ascarids. Figs. 4, 5, 6 and 7 refer to the life cycles of *Tænia granulosa, Fasciola hepatica, Strongylus vulgaris,* and *Metastrongylus elongatus,* and show

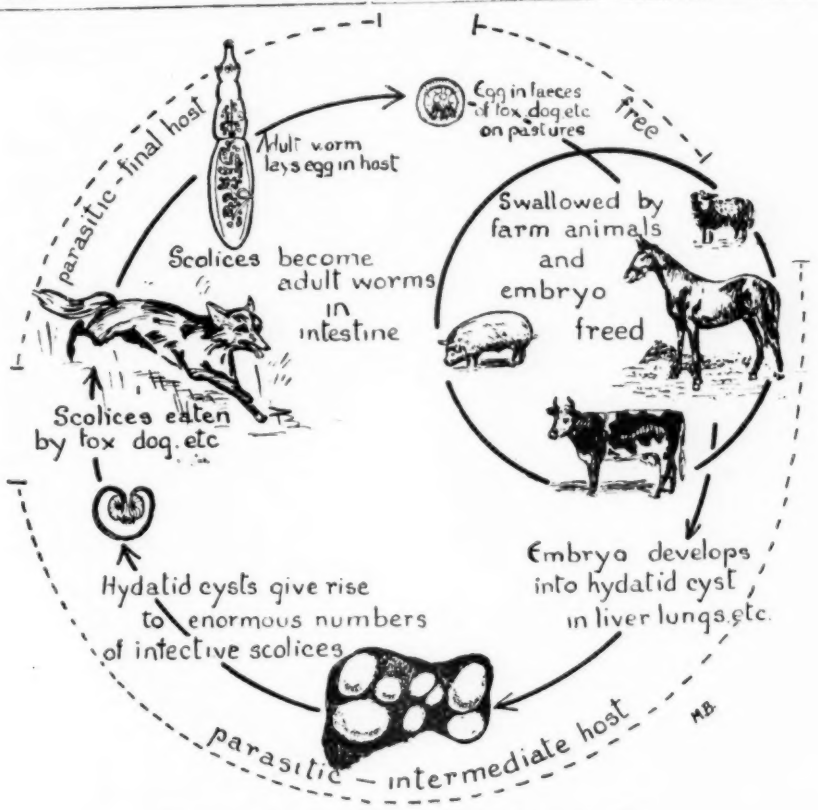
parasitic - final host
Adult worm lays egg in host
Egg in faeces of fox, dog etc on pastures
free
Swallowed by farm animals and embryo freed
Scolices become adult worms in intestine
Scolices eaten by fox dog etc
Embryo develops into hydatid cyst in liver lungs etc.
Hydatid cysts give rise to enormous numbers of infective scolices
parasitic — intermediate host
M.B.

Fig. 4.—Life Cycle of *Tænia granulosa*.
(Echinococcosis or Hydatid Disease.)

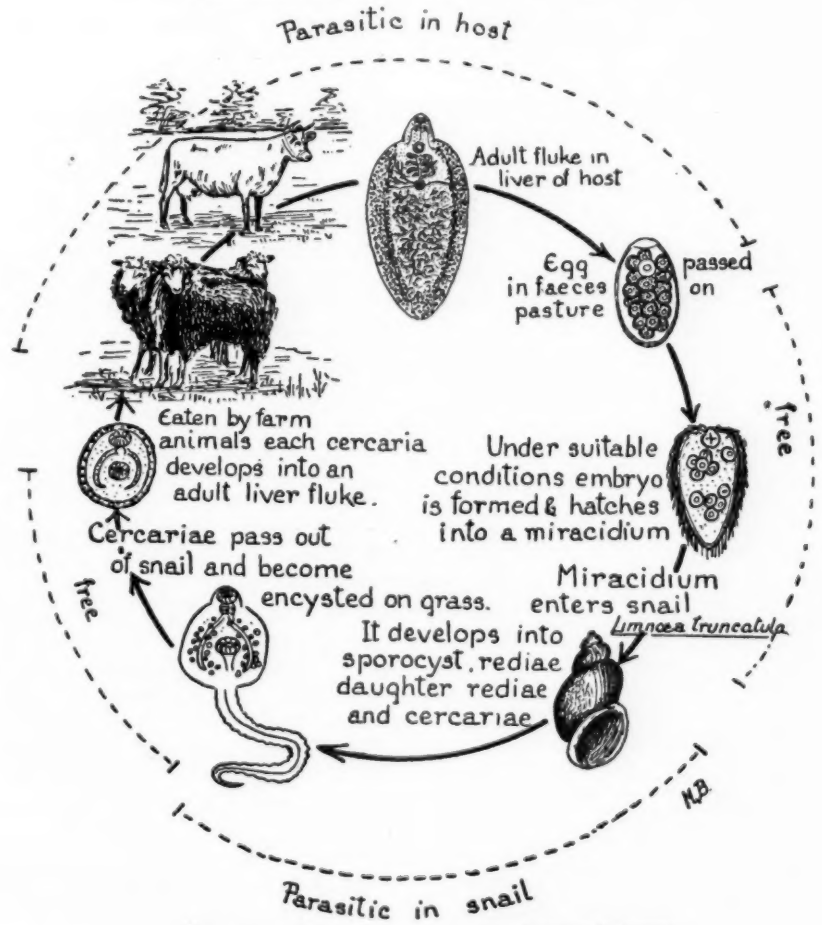
Parasitic in host
Adult fluke in liver of host
Egg in faeces passed on pasture
free
Under suitable conditions embryo is formed & hatches into a miracidium
Miracidium enters snail
Limnaea truncatula
It develops into sporocyst, rediae daughter rediae and cercariae
Cercariae pass out of snail and become encysted on grass.
Eaten by farm animals each cercaria develops into an adult liver fluke.
free
M.B.
Parasitic in snail

Fig. 5.—Life Cycle of the Liver Fluke
(*Fasciola hepatica*).

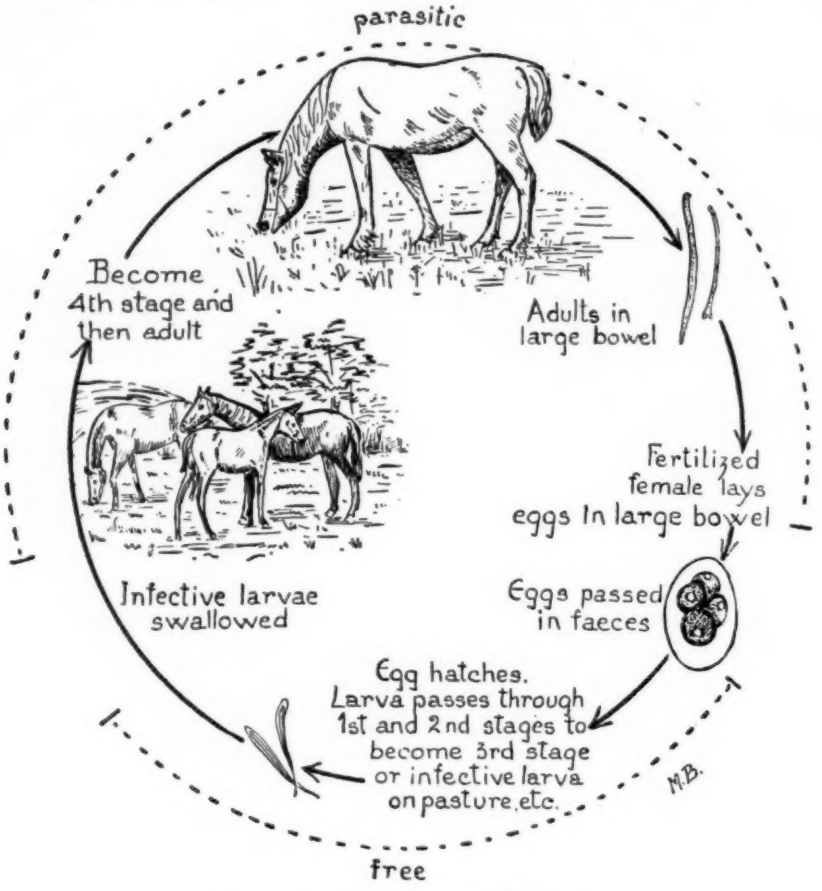
parasitic
Become 4th stage and then adult
Adults in large bowel
Fertilized female lays eggs In large bowel
Eggs passed in faeces
Egg hatches. Larva passes through 1st and 2nd stages to become 3rd stage or infective larva on pasture etc.
Infective larvae swallowed
M.B.
free

Fig. 6.—Life Cycle of a Strongyle.

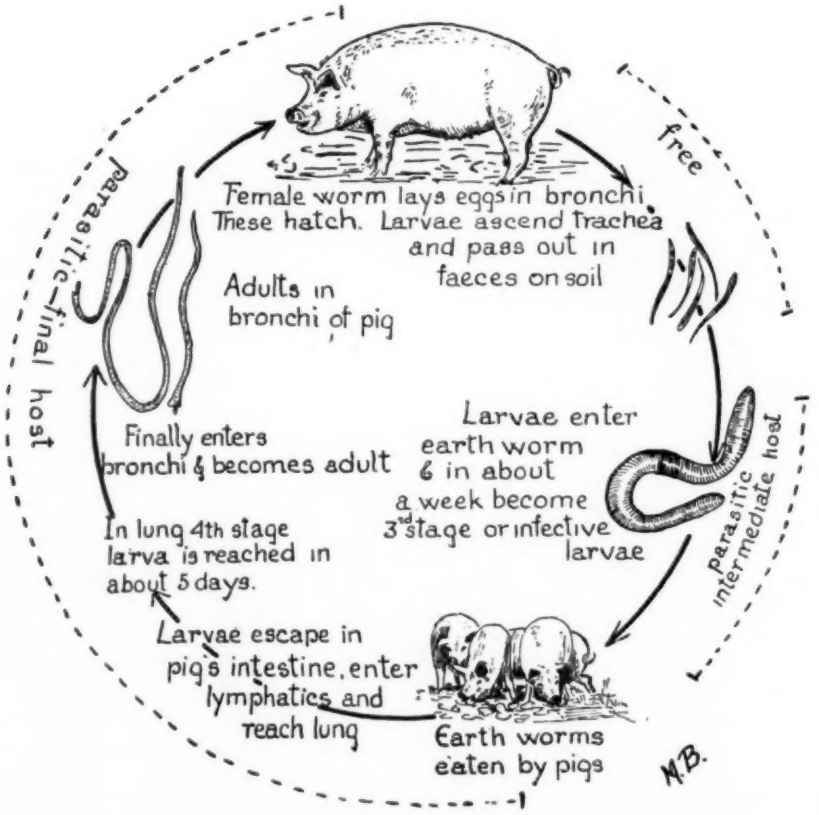
parasitic—final host
Female worm lays eggs in bronchi These hatch. Larvae ascend trachea and pass out in faeces on soil
free
Adults in bronchi of pig
Finally enters bronchi & becomes adult
Larvae enter earth worm & in about a week become 3rd stage or infective larvae
parasitic intermediate host
In lung 4th stage larva is reached in about 5 days.
Larvae escape in pig's intestine, enter lymphatics and reach lung
Earth worms eaten by pigs
M.B.

Fig. 7.—Life Cycle of *Metastrongylus elongatus* of the Bronchi of the Pig.

the advantages of the graphic over the descriptive methods.

Fig. 6 shows the life cycle of one of the equine strongyles. The egg, on coming to the exterior, passes through the first and second larval stages to become the third or infective larva. The time taken for this varies with the species and the environment. It is comparatively short. The changes can certainly take place in the stable, where the infective larvæ may live for long periods. In the open, it is often longer than a year. On being ingested, the fourth stage is reached. Subsequent wanderings in the body vary with the species. Sometimes the immature forms enter the mucosa, moult, and reach the lumen of the bowel to become adult. At other times they are carried by the lymph stream to the blood, heart and lungs; thence by way of the trachea, larynx and œsophagus to the normal habitat of the adult. *S. vulgaris* is often found in arteries, *S. edentatus* under the pleura, peritoneum and in the hidden testis, and *S. equinus* in the pancreas. The lung worms of sheep and cattle do not go further than the bronchi. The species of *Dictyocaulus* do not appear to require an intermediate host, but the Hobmaiers have shown that *Protostrongylus, Muellerius, Metastrongylus,* and *Chœrostrongylus* do. In the case of the first two, it is small slugs and snails, and in the latter two, earth worms. This is shown in Fig. 7.

The eggs of the adult parasites mentioned in this paper have to come to the exterior in order to complete the life cycle. As there is no actual multiplication without this, it becomes a matter of more than academic interest to know how long parasitic worms may live within their hosts. On this subject our knowledge is rather imperfect. In ascertaining the age of an infestation, it has to be remembered that there are often risks of re- or auto-infection. There is, however, some evidence to show that they do not suffer destruction in cycles as do many free-living forms. Some may live for several years within their respective hosts, and in many cases, for longer than the commercial food animals are kept alive. Taylor[7] has recently collected several of these records. A treated animal may still harbour odd worms, and so becomes a carrier.

Although one cannot here enter into a discussion on detailed treatment, there are some points which must be mentioned. Anthelmintic medication has made rapid strides during the last decade, thanks to a few devoted workers, but there is a great deal still to be accomplished. In equines, the first question of importance is the duration of the fast. Within reason, the longer this is, the better. Apparently, it must never be less than 36 hours, and may go up to 60. Water should be offered during the fast. The second is the use of the stomach tube, which allows substances irritating to the mouth, throat and upper air passages to be delivered directly into the stomach without waste or injury. Bisulphide of carbon, tetrachloride of carbon, oil of chenopodium, tetrachlorethylene, and oil of turpentine have replaced most of the old powders. With the oils, a purgative is necessary. Some formulæ contain, in addition to the active principles, solution of aloes, linseed oil, formalin, salt and water. I have reports of large doses of linseed oil causing symptoms of laminitis. My experience is that *Oxyuris equi* and *Anoplocephala perfoliata* are still difficult to treat. In cattle, *Hæmonchus contortus* responds to copper sulphate, either alone or with arsenite of soda or sulphate of nicotine. Tetrachlorethylene is also used with success. The hookworm *Bunostomum phlebotomum* is also treated with the latter. It has to be admitted that treatment for mixed infestations causing gastro-enteritis is far from satisfactory, but considerable improvement sometimes follows general methods. Owing to a number of factors, carbon tetrachloride must be judged unsafe for bovines, but male fern and a number of proprietary substances are used successfully against the liver fluke in cattle. The present view of the treatment of husk is that intratracheal injections do not stand the test of experimental control, and that the general measures instituted at the same time are responsible for the improvement when it is seen. Chloroform vapour, however, still has its advocates. In the small ruminant, the position is very much the same as in the ox, save that carbon tetrachloride has an extended use for liver fluke disease after a trial on a few animals. Copper sulphate and nicotine are used for *Moniezia* infestations. In pigs, ascaris infection overshadows most other aspects, and here oil of chenopodium or tetrachlorethylene in capsules are at present in most common use. The life cycle of the pig ascarid is somewhat similar to that shown in Figs. 2 and 3. Finally, I should be failing in my duty if I did not allude to the admirable and complete lecture given by Henry to the post-graduate class at Alfort in 1931, and which was fully reported in tabular form in the French "Record" later.[8]

Important though treatment may be, it is in most cases of small moment when compared with prevention and control. Selling off for anything but slaughter may be immoral, but not to enforce preventive measures is often financial suicide to the practitioner as well as to the stock owner. What has to be done depends upon the class of farming, the physical characteristics of the farm, the breed of animal, the surroundings, and the type of farmer. With opposite types of farmer, but with all other conditions the same, the advice to be given may be " slaughter out, and don't keep any more of the animals in question " in one case, and yet in the other,

medication and hygienic measures may lead to completely satisfactory results.

The first step in the control of parasitic diseases is the collection of sufficient data and knowledge concerning them. This could be brought about by the formation, within this Association, of a committee on parasitic diseases. It would be composed of laboratory workers, practitioners and observers in certain counties, together with selected veterinary meat inspectors in large abattoirs, who would collect information and specimens. The committee would report from time to time, drawing the attention of the profession to advances, to publications, and to the prevalence of different species of parasites. Uniform statistics from abattoirs would be instituted, and fresh facts would show themselves. A vigorous and learned veterinary profession ought to be regarded by stock owners as one of the best forms of animal insurance.

shall have someone else taking our work in hand, and organising area treatments and prophylactic measures, and then there will be voices of protest. How rarely is the veterinarian associated with warble fly and dietetic campaigns, and how often is it the agricultural zoologist or some other adviser who is in command?

In Wales, liver fluke disease was entirely neglected, yet when one of our own profession showed how the results of his investigations could be used for the control of that disease, he was blamed for " the loss of the sheep to the general practitioner."

As an example of the difficulty of dealing with some of our statistics, let me take the condemnations due to *Fasciola hepatica.* I have extracted the following figures from the Report of the Chief Veterinary Officer for Birkenhead for 1931:—

Table III.

	Irish	Manx.	Home Fed.	Total.	Value.
Cattle killed	43,524	98	210	43,832	—
Livers condemned	6,462	1	40	6,503	£1,950 18 0
Percentage affected	14·85%	1·02%	19·05%	14·84%	—
Sheep killed	782	67	11,582	12,431	—
Livers condemned	9	—	489	498	£37 7 0
Percentage affected	1·15%	—	4·22%	4·01%	—

In the Report of the Thirty-sixth Annual Meeting of the United States Livestock Sanitary Association, held in Chicago in 1932,[6] there is a seven-page communication from such a committee. It contains a review 1912-1931, sections on the worms of each of the important farm animals, recent advances in parasitology, and recommendations. The following extract applies equally to this country:—

> " In general, parasites are neglected, There are too few persons with live interest in the subject and with authority to inaugurate and push programs. Preventive measures are not particularly well understood. No one knows, nor is there any way at present to ascertain, the percentage of animals affected. The greatest losses are due to internal parasites, but more attention should be given to external parasites. We need more study and definite plans for control if the livestock industry is to maintain a profit. Parasitism produces much more loss than is generally appreciated. It means that in order to supply the market, poor as returns are, many more breeding animals must be maintained than are necessary."

Human medicine is yearly becoming more closely related to the State. The tendency appears to be spreading to our calling, and if practitioners do not rise to the occasion, we

When the figures of several other towns were considered, it was not possible to fit them in at all. In some cases, all organs were grouped together; in others there was no distinction of hosts; and in others, reference to the carcass was missing. The compilation of national statistics from such returns is impossible.

When control measures are enforced for a definite species of parasite, they may be called " special," and when for several forms in perhaps different hosts, they are " general." The aim is to prevent the development of the parasites by breaking the life cycle at the most vulnerable point—or what is almost the same thing stated in another manner—to prevent infection of the host by the easiest method. It is for these reasons that detailed knowledge of life histories is so essential. Which measures are to be discussed first depends entirely upon which part of the life cycle comes first into view. As in many other cases of a similar nature, they resolve themselves into a number of " Do's and Don'ts."

GENERAL MEASURES

Many of these should be part and parcel of the systems of animal management and rearing. It is our task to see that they become so wherever it is necessary.

Avoid Overstocking or Overcrowding.—There is no definition of these terms, and in intensive

methods animals are so closely herded together that even our conception of them is surpassed. If none of the flock and none of the food and water becomes infected, little happens. It is needless to point out that many of our patients defæcate on their "dinner plates" for the simple reason that they have nothing approaching the water carriage system of sewage disposal of highly-civilised communities. It is not suggested that an attempt should be made to emulate it, but more use can be made of our existing knowledge than we are doing at present. It is necessary to impress on owners how the chances of infection rise on a given area as the number of animals increases, as the duration of the stay lengthens, and as the number of excreted eggs augments. All these lead to the same thing. In other phraseology, it is an overdraft leading to disaster. Doubling the grazing area, halving the stock, and weeding out the clinically affected have often given satisfaction. It is sound, as a general rule, just to understock.

Permanent Pastures.—Hall has coined the slogan "permanent pastures perpetuate parasites." This requires little emphasis when we realise how long the infective larvæ of several species may live. A number of prophylactic methods centre round this fact. Still, farming does not exist solely to stamp out the parasites of one host, and control measures must fit in with the general scheme of farm management.

Soiling.—I have never been able to understand the reasons for using this word to indicate the cutting of a green crop and feeding it from mangers or racks. Apart from its value as a control measure, it has long been held by many to be economical and desirable for other reasons, *viz.*, less damage to the crop, resulting from pulling the roots, no hoof holes, no manure heaps, etc. Some crops can be cut five or six times a year. There is thus the added nutritive value of young short shoots. I have seen this method used with very good results, and know of no more difficulty in the way than in keeping calves indoors for twelve months, or not turning pigs out to graze.

Mixed grazing, long advocated in definite proportion for reasons of husbandry, allows larvæ to be picked up by animals in which the development will not be completed, and so reduces the chance of infection of susceptible hosts. It is usual to advise that young animals should not be mixed with old ones on account of the carrier question and the infective larvæ finding a more suitable habitat in the young. This is almost impossible to carry out in some cases.

Dosing the mare, cow, ewe, or sow before or early during gestation, is a line of attack which is capable of considerable extension. It has the additional advantage of being of some value in preventing intra-uterine infection in those cases where there is any possibility of the active fourth stage larva boring across the placenta. An adult cow with a few lung worms is a danger to calves grazing with or after her.

Dry Land.—It has long been held to be dangerous to turn certain animals on to special pastures before the dew has disappeared. This view is expressed in many countries. We now know that in moisture, infective larvæ are more active and ascend the blades of grass; chances of infection are therefore then greater. Naturally dry or high land is thus preferable, and agricultural drainage advisable. This outlook is responsible for the suggestion of housing by night, and turning out for limited periods by day.

Isolation of new arrivals has long been advocated in the prevention of diseases whose onset is manifested by definite clinical signs. Its extension to those conditions whose presence can only be detected by some test is now adopted in the control of glanders and tuberculosis. Its value is none the less for parasitic diseases. In a breeding stud, it is essential if the premises are to be kept free or the mare is to be sent back without having become infected.

Disposal of Excreta.—As the complete life cycle of the common helminths of farm animals cannot be completed within the host, it follows that the eggs in the excreta are prime factors in the spread of diseases due to them. Eggs or larvæ become infective or reach intermediate hosts on the floors of habitations or on pastures. In fields the spreading of droppings by hand, bush or harrows exposes larvæ to the effects of sun and dryness. Indoors our ideas of worm destruction are rather cramped because of our germicidal outlook. Thorough cleanliness by scalding with water, a solution of one of the crude caustics, the blow-lamp, or white-washing are methods of choice. There is some evidence to show that larvæ remain alive in out-of-the-way places indoors, later to be blown into buckets and on to food. Indoor infection is sometimes quite important, and if contamination of food and water takes place ascarids may sometimes reach alarming numbers in housed horses. The same is occasionally true of oxyurids. It is, of course, equally so in the case of ascarids in pigs in sties, where the hygiene is so low as to allow the eggs to become infective, and thus contaminate the food. Although I have not included *Cysticerus tenuicollis* (= *Tænia marginata*) in Table II for the sheep and pig, I have seen fatal cases of liver invasion in both of these animals, and in the goat indoors, where a dog bearing the adult was in close contact.

It has to be admitted, however, that the summer run at grass is a common means of infecting both draught horses and hunters with strongyles. Some owners have had such experiences in this direction that summering is now carried out by keeping the animals "up."

Although on some farms it might pay to house the animals, allow exercise on bare ground, and burn the manure, it has to be borne in mind that manure is valuable, and more often than not has to be used. It should, then, be set aside for land which is not going to be grazed; chemical manure being employed on stocked land. Schwartz has recommended a box for the storage of horse manure. It retains the heat and so prevents the development of the larvæ. The sides, bottom and top are six inches thick—two layers of wood with sawdust between them. When filled, it is kept closed for 14 days. Manure is often the breeding place of flies, and if the heaps are covered with a foot of hard-pressed soil, there is some evidence to show that this procedure acts somewhat like the box. Manure can sometimes be stacked, fenced in, and left for a longer period than usual in order to use it on arable land. Disease may be, and apparently is, sometimes brought on to premises by the purchase of manure from places where animals suffering from parasitic diseases have been kept or slaughtered. Manure may infect the banks of streams and surroundings of drinking places.

Uncontaminated food and water is to be aimed at in order to prevent primary infection, re-infection and auto-infection. In a clean stable, byre, sty or "bare lot" with mangers and troughs which are unsoiled by fæces, and with egg-free food and water, the chances of infection are small. Taken in time and treated under these conditions, one even hopes gradually to improve affected animals. The raised water-trough in pastures and in yards, to replace streams, pits and ponds, is of the utmost value, as also is the fencing off of undesirable "water-holes."

Rotation.—If pastures remain infective for over twelve months, it follows that a couple of consecutive crops where active cultivation is used, will give them time to become safe. It is not always easy to carry this out. In such cases it may be possible to graze a host which is not susceptible to the parasite which has infected the field, *e.g.*, sheep and cattle on a "red worm" pasture.

Destruction of Worms.—The more efficient our anthelmintic treatment, the nearer can we hope to render the bowel or other organ free from the blame of scattering infection far and wide. Here stud, flock or herd dosing is to be recommended where reliable drugs exist. With modern methods, the efficiency of anthelmintics can be stated, and fæcal examination allows us to test the results of treatment. An improved and quickened outlook is required with regard to worm disposal. A large female ascarid should be rushed to an incinerator or like destination. The proper destruction of condemned material from slaughterhouses is of utmost importance in echinococcosis and so is the enforcing of bye-laws prohibiting the access of carnivores, wild and domestic, to slaughterhouses. In stables, byres and sties, the destruction of larval forms, escaping other measures, can be brought about by thermal and chemical means. There is little or no evidence to support the use of lime and iron salts for this purpose on pastures. Burning of pastures has only a very limited use as far as our hosts are concerned.

Destruction of Intermediate Hosts. — In distomatosis it is possible to attack the snail by encouraging its natural enemies, such as certain wading birds, by drainage, and by dressings of copper sulphate. In habronemiasis, the domestic and stable flies are the intermediate hosts, and measures for their destruction include the prevention of egg-laying and hatching in manure. In the case of the small lung worms of sheep, several species of snails and slugs are known to harbour the larval forms. The respiratory strongyles of swine pass through different species of earth worms, but the latter have an agricultural value. In the case of some other worms of farm animals not listed here, dung and other beetles act as intermediate hosts. Where the disease is due to a larval form, such as in "gid" and echinococcosis, the final host may have to be destroyed, treated or removed. Apart from harbouring stages in the life history of a given species, some wild animals may become infested with the adult, and may be the means of keeping certain pastures infective. Rabbits are known to suffer from liver fluke, and there are wild or park ruminants susceptible to several nematodes of cattle and sheep.

Diet.—At present little is known concerning immunity to helminthic infections, one cannot create it by artificial means and use it in the field. There is, however, some evidence to show that susceptibility and resistance are varying factors which can be influenced by things we can do. The susceptibility of youth is lessened with maturity and the resistance of adult life decreases with old age. A low diet, a lack of vitamins and a low supply of minerals appear to predispose to infection and, in some cases, correction of these defects seems to increase resistance. An unsuitable diet seems to weaken the defences of the viscera and to predispose to infestation.

Post-mortem Examinations.—Although autopsies cannot be strictly described as preventive measures, they can be of the greatest possible service in this direction by disclosing widely differing infestations, by discovering hidden disease and by indicating the exact species of worms present. A *post-mortem* examination must be deliberate and systematic. Sheep may harbour lung worms and liver flukes, and yet be suffering from a mixture of gastro-enteric strongyles. The latter may be microscopic and easily escape detection unless material is further

examined. I have seen goats with lung worms, strongyles, and coccidia in the intestines, which were really suffering from Johne's disease. If the real cause of disease is strongyles, there is bound to be dissatisfaction with the results from measures against the liver fluke alone. Whenever an opportunity allows, a *post-mortem* examination and study of any worms present in the various organs is of inestimable value to any stud, herd or flock where disease prevention is enforced. I can recall many such discoveries where animals have died from accidents or when they have been slaughtered in the usual way. It seems to me that this aspect might be impressed on stock owners with considerable advantage to them.

SPECIAL MEASURES

By applying one or more of the methods which have been enumerated above to any special parasitic condition under given circumstances, it should be possible to formulate control measures which embrace most of the essentials of our modern knowledge, and in that respect it ought to be satisfactory. These should include:—

(i) Microscopic diagnosis of the condition in one or more animals.

(ii) Treatment of all animals on a confined space and destruction of fæces.

(iii) Measures against the egg or infective larva, *viz.*, ploughing, rotation, grazing non-susceptible animals and soiling.

(iv) Destruction of intermediate host, where one exists, by dressings, drainage, or natural enemies.

(v) Generally improve hygiene and dietetic measures so as to lessen the chances of infection and increase resistance.

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Discussion

The first session of the Section of Veterinary Medicine and Surgery was devoted to the consideration of the subject introduced by Captain Noel Pillers in the above paper. There was a fair attendance at the Town Hall, Llandudno, for this discussion on the morning of Wednesday, September 20th.

Captain R. L. Lewis, M.R.C.V.S., D.V.H., the President of the Section, immediately called upon the opener.

Captain N. Bissett, M.R.C.V.S. (Adviser in Veterinary Science, University College, Cardiff), in opening the discussion, said:—

I should like, in the first place, to congratulate the Provisional Committee on their choice of the subject of our discussion to-day. It is being increasingly shown year by year that internal parasites are far more important, both in their direct and indirect effects, than was formerly thought, and it is quite time that the subject was viewed in its proper perspective.

I do not think I need congratulate the Committee on their choice of the giver of the paper —indeed, I think I may safely say, without hurting any eminent feelings, that the choice could have fallen on no more fitting person. We all know that helminths are Captain Pillers' hobby, and the eminence to which he has risen in the subject of helminthology carries with it only one penalty—if it may be called a penalty—that one cannot hear the name of Pillers without associating it with parasites.

I must congratulate him on the extremely able way in which he has taken the cream of the vast subject of his paper, condensed it, and served it up for our benefit in such a palatable and interesting form. He has done this in such a masterly manner that I find it difficult, in opening this discussion, to avoid the danger of giving merely a paraphrase of his paper, so well has he said almost everything there is to be said on the subject.

There is no doubt that helminthology has not hitherto received the attention to which it is entitled, except in more or less isolated quarters, and in these the attention seems to be directed more to morphology than to methods of control which, after all, are what really matter to the veterinary surgeon and farmer.

Captain Pillers apologises for giving a review of present knowledge on the subject rather than any addition to it. If I may say so, this apology is quite unnecessary. If we are to take the subject of Helminthology seriously (and if we do not take *it* seriously it will take *us* seriously one of these days) it behoves us to put our house in order, and in doing that, the first thing is to make an inventory of our present knowledge.

I sometimes wonder how much of the alleged indifference to parasitology, and especially helminthology, is due to the continual changing

of nomenclature. One lecturer I knew used to say to his class: "The name of this worm is so-and-so; next year you must find out its name for yourselves." No doubt accuracy in identification is important, but there seems to be a grave danger of it becoming a mania. I cannot see how this eternal creating of sub-genera and species is going to help us to eradicate worms from our domestic animals. We all know the damage done by the parasite of "husk," and it will do the same damage whether we call it *Strongylus micrurus* or *Dictyocaulus viviparus*.

This habit of name changing is, of course, by no means confined to helminthology. It is equally the curse of bacteriology. No doubt our morphologists will tell us that it is unavoidable, but it is discouraging to the average worker, to say the least of it, and does tend, I think, to militate against his taking as great an interest in the subject as he otherwise might.

Perhaps Captain Pillers will tell us when, in his opinion, we may expect to have a definitely standardised nomenclature. I have no doubt that, when this does take place, if ever, one of the greatest stumbling blocks to the popularisation of the study of helminthology will have been removed.

In order to effect this and other desirable ends, I sincerely trust that the excellent suggestion of the formation of a Committee on Parasitic Diseases within this Association will be immediately acted upon.

As we are, to all intents and purposes, such a committee at the present moment, perhaps I may be allowed to say a few words on my experiences with one or two of the parasites especially mentioned by Captain Pillers, in the hope that others will follow suit.

I notice that more interest is being taken in the occurrence of *Anoplocephala perfoliata*. I should like to ask Captain Pillers what is the average number of these parasites present in cases which have come to his notice. Neumann mentions as of special interest a case in which he found 104 of the worms, and also states that Krabbe, of Copenhagen, found 25 to be the average number in 20 horses, two of which contained between 200 and 300, and one 400. In 1924 I found the average number in six horses which were affected with a disease known locally as "mountain disease," to be 42. From one of these cases I recovered 154 specimens. The average length was one-and-a-half inches as compared with one inch given by Neumann. Several of the worms in the case I have mentioned were fully two inches long.

I should also like to know whether Captain Pillers would say that *A. perfoliata* produces any characteristic symptoms. In mountain disease the chief symptom was spasm of the larynx, and I was interested to find that Brumpt mentions this particular symptom as being manifested by a child which harboured the cestode *Hymenolepis nana*.

My own experience in connection with the ecology of *A. perfoliata* is that it is most frequent on high-lying ground, and I should be glad to know whether I am correct in holding that opinion. I know that Le Roux, in his list of Helminths of British Equines, states that the parasites were of much more common occurrence in London than in Edinburgh, where they were only twice met with.

At the risk of being ruled out of order, might I ask Captain Pillers at this point if he would kindly give us some information on the incidence of *Anoplocephala mamillana* in this country. I ask this because I have found these parasites several times in South Wales and yet the information on them appears to be very scanty. When I first encountered them in March, 1924, also in a case of mountain disease, I could find no reference whatever to their occurrence in this country. In July of the same year Le Roux published his list of Helminths of British Equines, in which he stated that he found *A. mamillana* on only one single occasion, and mentioned that he had failed to find any reference to its previous occurrence in Britain. In the case I have mentioned I found 30 specimens and, as I have said, I have found them on several other occasions but in much smaller numbers. They are much smaller than *A. perfoliata* and might be mistaken for pieces of fat.

I was interested to learn of the prevalence of *Echinococcosis* in export horses. I remember one peculiar case in a pit pony which had spent most of its seven years of life in the mine. This animal suddenly became paralysed in all four legs, and the veterinary surgeon who brought the case to my notice told me that he was in the act of examining it when it appeared to be seized with severe abdominal pain and died almost immediately. The *post-mortem* examination showed no internal abnormalities except in the case of the liver. In that organ there were 14 cysts, measuring from half-an-inch to two inches in diameter. Only two of these cysts projected from the liver surface, and that barely an eighth-of-an-inch. In fact, if it had not been for these the organ would have appeared normal.

Echinococcosis is certainly very prevalent among sheep in parts of South Wales. I should say, myself, that sheep were more affected than cattle, but perhaps that may be for the same reason that white sheep eat more than black.

With regard to *Fascioliasis*, last year was by far the worst in my experience for this condition in bovines, and I would be interested to hear other opinions on that point.

I should like to compare notes with Captain Pillers on every parasite in his list, but that is

quite impossible in the time at my disposal. I should like, however, just to mention *Strongylus vulgaris*. I am inclined to think that the importance of this worm is rather unduly overshadowed by the *Cylicostomes*. During the strike of 1926 there was a considerable number of deaths among pit ponies which had been brought to the surface. In every case which I had the opportunity of examining, verminous aneurysms were present in which the larvæ were quite easily found. In addition, however, the larvæ were also encysted and calcified in the walls of the colon and cæcum in such numbers that the mucous membrane was perfectly black and felt somewhat like coarse sandpaper. The intestinal walls were much thickened and the functional activity was completely destroyed. I have had a considerable number of similar cases, apart from the aneurysms, brought to my notice where the trouble appeared definitely to be due to strongyles and not to cylicostomes.

With respect to control measures, I must here congratulate Captain Pillers most heartily on the emphasis he has placed on the importance of obtaining as thorough a knowledge as possible of the life histories of the various parasites, and on the excellent diagrammatic representations of the more important of these life-histories. These are well worthy of enlargement and of a place on the walls of every surgery and teaching institution connected with the subject.

In war every successful general makes a study of the weak points in the enemy's tactical scheme, and so it is in the case of helminth control. Our objective is to find the weakest link in the evolutionary chain, as in the case of liver fluke, where one attacks the parasite when it is in the snail.

The longevity of worms in their larval and adult stages is of the greatest importance, and I feel sure that the article on the subject by Mr. Taylor, of the Ministry Veterinary Laboratory, was an eye-opener to some of us.

Some years ago I carried out a few experiments on *Metastrongylus elongatus*, the lungworm of the pig. I found, in the first place, that rats played an important part in the transmission of the parasites. The eggs passed through the alimentary tract of the rat quite unchanged. I divided a number of larvæ, hatched from eggs recovered from rat fæces, into three groups. The first group remained in the original water in which they were hatched; in the second group the water was changed daily, and various lethal agents were tested on the third group.

In Group I—in the original water—the larvæ remained alive for four weeks, while in Group II, where the water was changed daily, they lived for three months.

During the experiment, a very frosty night occurred, and a petri dish containing a number of larvæ in about a sixteenth-of-an-inch of water was placed in the open air overnight. Next morning the water was frozen solid. The petri dish and contents were then thawed in the incubator, when most of the larvæ were found to be as active and lively as ever.

As far as general control measures are concerned, I have little to add to those advocated in the paper. To my mind, the main points are avoidance of overstocking, and the prevention of reinfection by rotation of pastures and properly controlled disposal of manure. The problem of continual reinfection is perhaps the most difficult with which we have to contend. I believe that many cases of parasitically infested animals would recover spontaneously if they were removed early enough to fresh ground. I tried the experiment once of removing six pigs which were practically skin and bone through *M. elongatus* infection, to another field for treatment, while the rest of the herd were treated in their premises, which were thoroughly disinfected. It was remarkable to notice how the six pigs, which were easily the worst in the herd, recovered much more quickly than the others.

I am glad to see that Captain Pillers emphasises the importance of indoor disinfection. This is especially important in the case of pigs. There is no disinfectant to equal the blow-lamp, or, failing that, a solution of some crude caustic. In default of either of these I have had good results with strong salt solution. The ordinary germicides are of very little use.

I think there is no doubt that much will be discovered in the future regarding the relationship between diet and helminth infection. Some interesting experiments in connection with the stomach worms of sheep have been carried out at the Rowett Institute by Messrs. Fraser and Robertson last year. In these experiments, groups of lambs were fed on rations deficient in certain elements and were then pastured on worm infested ground along with lambs fed on rations complete in every respect. The result of the experiment showed clearly that, " under natural conditions of infection, the nutritional state of the sheep plays a significant part in determining the degree of its susceptibility to stomach worm infestation."

I would strongly support Captain Pillers' plea for systematic *post-mortem* examinations from the helminthological point of view. If such examinations are widely carried out and the results sent to the committee which I hope will be formed, I have no doubt that we shall be surprised at the amount of valuable information which will accumulate in a comparatively short period.

I am afraid I have left myself no time to

discuss anthelmintic medication. I hope, however, that this point will be raised by someone else.

I would say, in closing, that whatever control or remedial measures may be impressed upon stock owners, these measures will be greatly minimised, if not rendered useless, unless the stock owner himself is prepared to play his part. I have seen farms on which the disposal of carcasses, particularly those of the smaller animals, left much to be desired, to say the least of it, and I have also occasionally heard complaints about the amount of trouble which would be involved in taking precautions advised against disease. We cannot accomplish miracles, although that seems to be expected of us by some people.

Finally, may I once more thank Captain Pillers for his most comprehensive and instructive paper.

At this stage, the following communication, which had been received from Dr. T. W. M. Cameron, Professor of Parasitology, McGill University, Montreal (late of the Royal [Dick] Veterinary College, Edinburgh), was read:—

Captain Noel Pillers has performed such a marvel of compact and concise condensation in reviewing the helminths of farm animals that there is little left to discuss and still less to dispute. But fortunately there are a few minor points which justify my coming forward and provide me with an excuse to compliment the essayist.

Firstly, I must take exception to the use of the name "*Tænia granulosa.*" Both he and Dr. Southwell are, of course, fully entitled to regard "*Echinococcus*" as probably included in the genus "*Tænia*," but it should be pointed out that they are in a small minority. The Hydatid tapeworm is so very distinct from the ordinary Tænias; several species can be placed in the genus *Echinococcus*, and the life cycle is so different that I think it should be allowed to maintain an independent existence.

Secondly, still referring to his second table, I am doubtful of the advisability of including *Œsophagostomum columbianum* as a parasite of even potential importance to British sheep. We meet it here in Canada: it is common in the other Dominions and in the United States, but I have yet to find an indigenous case in Britain. It has been recorded in the old days from imported sheep, but the infections never seem to have become permanent and I believe that a warmer climate is essential for its satisfactory establishment. I would be inclined to add *Dicrocœlium* to this list, even although it is limited to the West of Scotland.

Thirdly, I must admit to a feeling of doubt as to the suitability of a flotation technique for the side-room of the practitioner. After a decade of teaching, I am strongly in favour of a simple smear or simple sedimentation technique as being simpler, cleaner, and more useful. This is not to be taken as decrying the potential usefulness of the more elaborate methods. These are specially intended for the laboratory, however. No amount of mathematics or juggling with specific gravities can change clinical practice from the art which it really is and it is quite impossible to say that *X* eggs equals helminthic disease. Far too many factors are involved, and while practice demands the use of accurate scientific methods wherever possible, these can only be accessories to experience. Smears or sedimentation methods will reveal the *presence* of eggs in clinical cases and enable a more or less accurate diagnosis of the species or parasite present to be made: the history of the case and the experience of the practitioner will enable a diagnosis of helminthic *disease* to be made. That is as far as we can go at present.

I would like to compliment Captain Pillers on his life-cycle drawings. I agree with him on the advantages of the graphic over the descriptive method. This is the method of teaching we used in London and Edinburgh for many years and it undoubtedly impressed itself on the students' minds much more effectively than mere lecturing.

The idea of a parasitological committee appears to me to be an excellent one. In a series of survey papers appearing in *The Veterinary Journal*, I have attempted to draw attention to the parasites at present believed to be of importance to the Empire. The Imperial Bureau of Agricultural Parasitology is also issuing a number of topical monographs dealing with recent knowledge of these parasites and *The Journal of Helminthology*, in its "Helminthological Abstracts," provides a cheap, convenient and up-to-date *précis* of every paper appearing on the subject. But this is not enough. The profession, through such a committee, would be kept alive to the importance of the subject and to the advances which are almost daily taking place. Perhaps even more important, it would be brought to realise that, as Mr. Pillers so pertinently points out, the veterinary profession is at present failing in its duty to the State. It is safe to estimate that parasites cost the country at least as much as do bacteria. The State has a right to look to the profession for advice and help in this matter and if it is not forthcoming we can have no complaint if laymen step over our heads. A most important step in maintaining our proper position in this matter would be the formation of such a committee. Most of the parasites of stock in the United Kingdom occur elsewhere, and no country has a more intimate connection with Britain in this respect than has Canada—not only because of its position in the north Tem-

perate Zone, but because of its important export trade. I have no hesitation accordingly of assuring this Congress that we in the Dominion will do all that we can to assist in the work of such a committee.

Major C. R. Chadwick, Director of the Civil Veterinary Department, Baghdad, Iraq, said that he had not intended to speak that morning, but he felt that, being a new entrant into the the research work on parasitology, he might let them know that three years ago they decided, in the country from which he came, to investigate the causes of the enormous wastage among the sheep in certain areas. They found they had to start at the bottom by mapping out a field of survey into the life history of parasites. They were particularly interested in Bilharzia of sheep, and they found that the first thing to be done was to make a survey of the whole country. It was extremely fascinating work, but they came across a most appalling state of affairs. They found schistosomes of several species that they never expected. In the course of their investigations they ascertained the fact that nearly 90 per cent. of the human population were affected also. The Mahomedan population, who were particularly shy about their genital parts, always refrained from asking for advice, and it was known for generations that the condition had been regarded as normal.

He would call attention to the value of working out the life histories in the field, and starting at the bottom.

He wished to thank Captain Pillers for his excellent paper.

Dr. R. F. Montgomerie (Bangor) frankly confessed that he was terribly disappointed at that moment, first, at the number present at Congress who had turned up to hear that paper, and, second, at the difficulty of getting speakers to carry on the discussion. Both seemed to him to be a very poor compliment to the author of one of the most valuable and well-informed papers that had come to his notice for some time. If that were an indication of the degree of interest that they, as a profession, took in helminthology, then it was a bad omen for the future.

Captain Pillers had given them a great deal in that paper, and he would not attempt to discuss it sectionally, but he would like to emphasise one of the most important points he had made, and that was the necessity for better teaching of that subject. He did not know how many gentlemen in that room had, during their veterinary course, seen the eggs of even one or two worms.

He would like to emphasise, further, the great necessity which still existed for good teaching of that subject in their veterinary colleges, and he hoped that when the committee which Captain Pillers had proposed—and which he (Dr. Montgomery) sincerely trusted would be set up—collected its results, it would stimulate better methods. Mention had been made of the diagrammatic method of teaching, and he must compliment Captain Pillers on the diagrams he had given in that paper. He would like to ask him, however, if he was satisfied with diagrammatic teaching in regard to worm eggs. Could they go with the diagram he had given them and identify eggs, as they could do if they had seen them under the microscope? His opinion was that it was of much greater value to the student to have someone who had had experience of those parasites and of microscopical work in connection with them to show them the eggs under the microscope; by that means they would go away with an impression such as could not be given by looking at a diagram.

Might he make a second point as to diagnosis? He was afraid that he did not agree with Dr. Cameron on the question of simply making smears and taking that as the means of diagnosis. He did think a flotation method a very valuable aid to the practitioner. He agreed that *X* number of eggs did not equal *Y* number of parasites, but he did think that, once one had a little experience, the number of eggs per field or coverslip was a very good clinical indication as to whether there was a number of parasites present which would produce clinical symptoms, or a number present which might do so, or only such a number as probably would not—and that, he thought, was was a very great aid to clinical diagnosis.

Further, in connection with diagnosis, he would like to emphasise the point (Captain Pillers had it in his paper) that there was great need for care in watching that there was not a double infestation. He could recall an outbreak of disease in sheep. The symptoms found were by no means characteristic of any particular parasitic disease. One of these animals was examined *post-mortem*, stomach worms were found, and that diagnosis was made, but the liver had never been examined—liver fluke infestation was the main cause of the outbreak. He could remember a reverse case, which might happen quite often, where the liver was examined and the stomach not at all; where fluke infestation was not the major cause of trouble.

He did feel that in their profession they should do a great deal more work than they did to guide their clients and meet parasitic disease before it had gained a firm hold. After all, many farmers could have some of their sheep (for instance) slaughtered at a local slaughterhouse; that provided an excellent opportunity of trying to help a client by keeping an eye on the degree and type of infestation existing in his flock. He knew of several instances in which the practitioner, by that

method, had been able to prevent the occurrence of a serious outbreak.

Mr. C. Weighton (Dunedin) congratulated Captain Pillers on his very excellent paper and also Captain Bisset on the capable manner in which he had opened the discussion.

He had expected to have had to say more, but Captain Bisset had covered most of the points which he desired to emphasise. He was to speak particularly of the treatment of parasitic gastritis in sheep, and his experience had been gained largely in New Zealand.

One of the main points in connection with that disease was, as Captain Pillers had pointed out, to avoid over-stocking. The next very important point was feeding.

Regarding the suppression of the disease amongst lambs, a few important points might be mentioned. The first was, lambs must not be allowed to lose condition immediately after weaning. That occurred very frequently in New Zealand when advice had not been sought by the owner. The next point was that lambs should be made accustomed to eating a little nutritive food such as bruised oats or, in this country, cotton-cake, etc., so that they kept in such good condition as to enable them to overcome the effects of infection with parasitic eggs. They had to stress that point more in New Zealand, because there was more hand feeding in this country than there was in New Zealand. He particularly desired to emphasise, however, the importance of accustoming lambs to nutritive food, because when they became ill it was very difficult to get them on to a change of feed.

Another point was to adopt frequent dosing of lambs during the danger period, and it was advisable, where one had an outbreak of parasitic gastritis, to tell one's client to adopt that procedure the following year, irrespective of whether or not he saw any signs of parasitic gastritis, as a prophylactic measure.

Mr. A. Brownlee (Moredun Institute) took it that all animals had more or less equal chances of taking up those parasites, as most of the latter were picked up from pastures, and one wondered why some animals should harbour more parasites than others, since the sources of infection were more or less equal in all cases. A worker at the Moredun Institute had made the observation that in good-conditioned sheep the number of ticks was less than in poorly-conditioned sheep, and the same applied to internal parasites. The governing factor seemed to be the presence or absence of fat in the tissues: could Captain Pillers suggest why lean animals should be more heavily infested than good-conditioned animals?

Professor T. Leiper (London School of Tropical Medicine and Hygiene) observed that perhaps some members might not realise that he attended that day as an Honorary Member. (Applause.) He came that day because it was with Captain Noel Pillers that he first joined in their discussions many years ago, at Cærnarvon.

He had not very much to say, though he could have discussed more fully the remarks of subsequent speakers than the opening paper; but he would like, if he might, as Director of the new Imperial Bureau of Agricultural Parasitology, to welcome the suggestion that their Association should form a committee for the study of parasitic diseases. As a Bureau, they had the duty of collecting the literature of helminthiasis, and they had found that in the last year more than 1,200 papers had been published throughout the world, many of great economic importance. If, in the course of that work they, as a Bureau, could be of any assistance whatever to their committee, they would be delighted to give that assistance. (Hear, hear.)

He desired, not to throw cold water on it, but to suggest a certain amount of hesitation about accepting the view that diet played any very important part in the control of parasitic worms. They all knew that, in the main, a poorly-conditioned person would be likely to suffer from helminthiasis to a larger extent than a person in better condition. But he felt that the work put forward by interested people in support of the view that vitamins and special diets were of value in the prevention or treatment of parasitic infestations had a number of fallacies in it. After all, one had to look at the treatment of animal infestations from the economic point of view, and if it was more economical to give a simple anthelmintic than to give doses of vitamins or minerals, then he thought the farmer should be allowed to follow the anthelmintic practice.

He could not see that control of helminthiasis in farm animals could be brought about except on a regional basis. There was such a transference of stock nowadays that if the individual farmer tried to keep his own land clean he would never succeed, because he would be for ever bringing in fresh infection with new stock.

Some other methods of prevention were being studied just now, such as "sectional" grazing and the new "grassland management" so strongly advocated during the last few years. They themselves had followed the latter system during the last three years but had found that the free-range animals suffered from helminthiasis much less intensely than on those plots left free of grazing for a period.

Another point which perhaps he might stress was, as had been emphasised by Dr. Cameron, the damage done by larvæ, *e.g.*, of the liver fluke. Then again, in regard to the examination of fæces, he had for many years taught the recognition of the few eggs found in the stools of man, and it took about one hundred hours to learn

these properly, because of the vast number of other particles of microscopic size found in the stools which were not eggs.

In regard to the nomenclature, he, like Dr. Cameron, had been accused of altering names, etc. But he must remind them that there were many very good reasons for having the right name. A name was not changed merely out of "pure cussedness"—(laughter)—the old name was often found to include several different families. Many of those parasites had very different life histories, and in the lungworms and Nematodes the importance of the life cycle was great. If they were not sound on their morphology they would not be on right lines as regarded their intermediate hosts and preventive measures. Further, there were several hosts that harboured the same species and sometimes the species had been named differently in other hosts. He thought, therefore, that if they were not to overlook reservoirs of infection, they must have their nomenclature right as regarded the individuality of the species.

THE REPLY

Captain A. W. Noel Pillers, replying, said that, in the first place, he considered that Captain Bisset was an ideal opener of a discussion, from the essayist's point of view. He had been extremely kind, and he did not think that he had said anything that had made him (the speaker) nervous, so that he need not be compelled to close the discussion quickly and not deal with the points raised. (Laughter.)

The first point he mentioned was the question of nomenclature. Professor Leiper had dealt with that so nicely that he could get away from it by saying that he hoped these changes would be fewer and fewer as time went on and that quite soon they might reach some degree of stability.

With regard to the questions raised by Captain Bisset concerning *Anoplocephala perfoliata*, he mentioned having found these parasites in horses affected with "mountain disease." He (Captain Pillers) had found them repeatedly, and not only in animals grazing on high-lying land but in coal mines. Their numbers varied considerably. One could find them sometimes in Icelandic ponies, where they could be seen attached all round the ileo-cæcal valve, but many could also be found in thoroughbred horses.

Captain Bisset had mentioned also what he (the essayist) submitted might be termed the characteristic symptoms of animals harbouring *Anoplocephala*. Some of them might remember that he read a paper on treatment at Torquay in which he used different terms for the various parasitic conditions. He then spoke of anoplocephaliasis, and someone asked if it was a condition which could be distinguished clinically. He replied "No," and that answer still applied.

Last year he found 18 *A. mamillana* in the small intestine of a yearling which had never been out of the City of Liverpool. The importance of that was that one could not know that a certain worm existed until people started to record their findings. Such findings should be recorded, with the clinical observations attached to them. (Hear, hear.)

Concerning the importance of the *cylicostomes*, and the changes in the bowel described by Captain Bisset, he thought others would have had similar experiences, especially with animals that had been protected from infection and then exposed to it, such as ponies brought up from the coal pits. Some of them might know that his father was very interested years ago in putting thoroughbred stallions on Welsh mountain pony mares with a view to breeding fast polo ponies. That was done on the hills of Radnorshire. All went well until the foals began to nibble. Many foals of this cross died, but the pure-bred Welsh mountain foals were scarcely affected although infested.

He thanked Mr. Bisset for his very kind remarks, and he was pleased that the opener thought that he had more or less achieved the desired effect in trying to write to such a complicated title.

At this stage he should mention that he had received a letter from Mr. E. L. Taylor, Helminthologist to the Ministry, in which he said that he had given Henry more credit than he should have done because the tables of treatment that author gave were in reality copied from Le Roux in a South African report. He (the speaker) wanted now to try to correct this mistake.

He was very pleased that Dr. Cameron had been good enough to write concerning the résumé that he had made. Dr. Cameron had done a large amount of work, and he had always maintained that *Tænia echinococcus*, which he (Captain Pillers) had called *granulosa*, should be put in a separate genus, *viz.*, *Echinococcus*. He also mentioned that he did not think that *Œsophagostomum columbianum* existed for long in this country. *Dicrocœlium* Dr. Cameron said he (Captain Pillers) might have added to the list. He thought that was possible, but he definitely stated in his paper that there was a number of gaps which could be filled by other people.

With regard to flotation and smears, Dr. Cameron held the view that a smear was quite sufficient. He (the speaker) was perfectly satisfied that it was not. He knew that Professor Leiper had raised that same point once before, and he thought it was sound that they should disagree emphatically on such a point as that.

Dr. Cameron had alluded to the admirable publications of the Bureau, and Professor Leiper had also referred to them. They had done a tremendous amount of good and he hoped they would continue, especially with the *Journal of Helminthology* and the Abstracts.

Major Chadwick had given them his views on the value of routine work on the importance of Schistosomiasis in sheep, but for the purpose of his paper he had restricted himself to the parasites met with in animals of the United Kingdom.

He entirely agreed with what Dr. Montgomerie had said in regard to worm eggs: a little bit of fæces, a slide and a microscope were ever so much better than the mere pictures. He was pleased that Dr. Montgomerie also had the same views on flotation versus films as himself.

He was very glad to hear what Mr. Weighton, of New Zealand, had said about lambs. The change over at weaning time from milk to taking on a new hard diet was of the utmost importance in all animals. They had a very good example of its importance in coccidiosis in rabbits, which did not bother the rabbit fancier who had an approved method of changing over from weaning to an adult diet. In a large number of cases loss of condition after weaning meant parasitic infection.

Mr. Brownlee raised a point about all animals having equal chances of infection. He (Captain Pillers) did not think that was so. He thought that under special conditions certain animals were likely to be more extensively infected than others—sheep, possibly, but mainly cattle—and he thought the different ways in which certain animals took their food had something to do with it. They all knew that animals in a healthy condition were more resistant to infestations of any kind than those not in the best of health. He would look into the question of fat layer. Up to the present he had not noticed it.

He was very delighted, as they all were, to hear Professor Leiper joining in the discussion. (Hear, hear.) It was 22 years ago, at the Cærnarvon meeting that he gave them a check list of parasites that occurred in the horse. The occasion was one of those delightful masterpieces of confusion of the late William Hunting. Both Professor Leiper and he (the speaker) opened the discussion on the same paper, when one opener would have been quite sufficient.

In conclusion, Captain Pillers said that he could keep them entertained for a long time by recounting numerous mistakes made in connection with what could be found on a slide of fæces, but he had just heard the clock. He thanked them for the attention they had given to his effort.

At the conclusion of the essayist's reply it was unanimously agreed that the following resolution be sent from the Veterinary Medicine and Surgery Section of Congress to the Council of the N.V.M.A.:—

> "That a committee of the National Veterinary Medical Association be formed at the earliest possible moment to foster a knowledge of parasitic diseases, and to act as an advisory committee to the National Veterinary Medical Association on questions of policy."

H.M. STATIONERY OFFICE PUBLICATIONS.

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Diseases of Animals Acts and Orders thereunder, Handbook of. January, 1926:— Amendment No. 7, including revised Index. September 30th, 1933. (24-37-7)	0 9	0 11

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DANGEROUS DRUGS ACTS: CODEINE AND DIONIN

With reference to the extension of control to methylmorphine (commonly known as codeine) and ethylmorphine (commonly known as dionin) and their respective salts, the Home Secretary gives notice that he is advised that pills and tablets that contain the drugs compounded with any other substance are to be regarded as preparations or compounds containing the drugs and therefore outside the provisions of the Acts.

* * * * *

VETERINARIAN'S PRODIGIOUS (GOLFING) DRIVE

"I have just heard," writes a sports correspondent in a recent issue of the *Evening Standard*, "of a golfing drive—fully authenticated—which must be very near a world's record.

"It was made by Mr. John H. N. Hobday, Government Veterinary Surgeon at Mafeking, South Africa. He drove a ball 448 yards—'a following breeze and a hard fairway no doubt aiding this prodigious feat.'

"The records of long-driving competitions, in which a distance of 300 yards has never yet been reached in this country, show that exceptional outside circumstances must favour any drive of greater length than this. Ted Blackwell, in 1892, drove a gutty to the steps of the clubhouse, 366 yards, at the last hole at St. Andrews, but the longest drive with the modern ball, 445 yards, was made by E. C. Bliss at Herne Bay in 1913."

General Articles

SCHISTOSOMES IN SOUTH AFRICAN STOCK

F. G. CAWSTON, M.D., CANTAB.

The study of Bilharzia disease in the Union of South Africa assumed added importance when it was shown, as long ago as 1915, at the Natal Museum, that some creature other than man might harbour the local parasite and that the spread of the infection in man or beast depended on the presence on any farm of the same pond-snail *Physopsis*. However, it was not until 1929 that this disease was discovered in South African sheep and, although the question immediately arose whether infected animals had been imported from Sardinia, where the infection is well known, no evidence of its having been introduced into the Union from this source could be found.

The prolonged drought has resulted in an increase of parasitic infection of stock and there would seem to be an increase of the common snail-host of *Fasciola* disease, *Limnæa truncatula* Muller, from the disappearance of the larger water-plants on the banks of pools and the increase of marshes in place of steadily flowing rivers.

There is still uncertainty about the life cycle of most of the larval schistosomes which infest South African pond-snails. One has been regarded as the parasite of some bird, whilst another was suggested as representing that of a water-rat. The recovery of a very large schistosome larva from pond-snails in water-lily pools into which water from zoological animals drained at Lourenço Marques suggested that the larger wild game were sometimes affected with the disease.

Unfortunately, much difficulty is experienced in procuring these blood-flukes from slaughtered stock and it is only from sheep at Humansdorp in the Cape and Vryheid in Natal that they have been readily recovered, besides man.

Human beings bathing in pools known to be infested with the schistosomes of sheep have usually avoided infection themselves, and it is at present impossible to state whether similar eggs found in persons harbouring *Schistosomum hæmatobium, Schistosomum mansoni,* or even both of these human parasitic worms, prove infection with the ovine parasite or whether they indicate the existence of a variety of

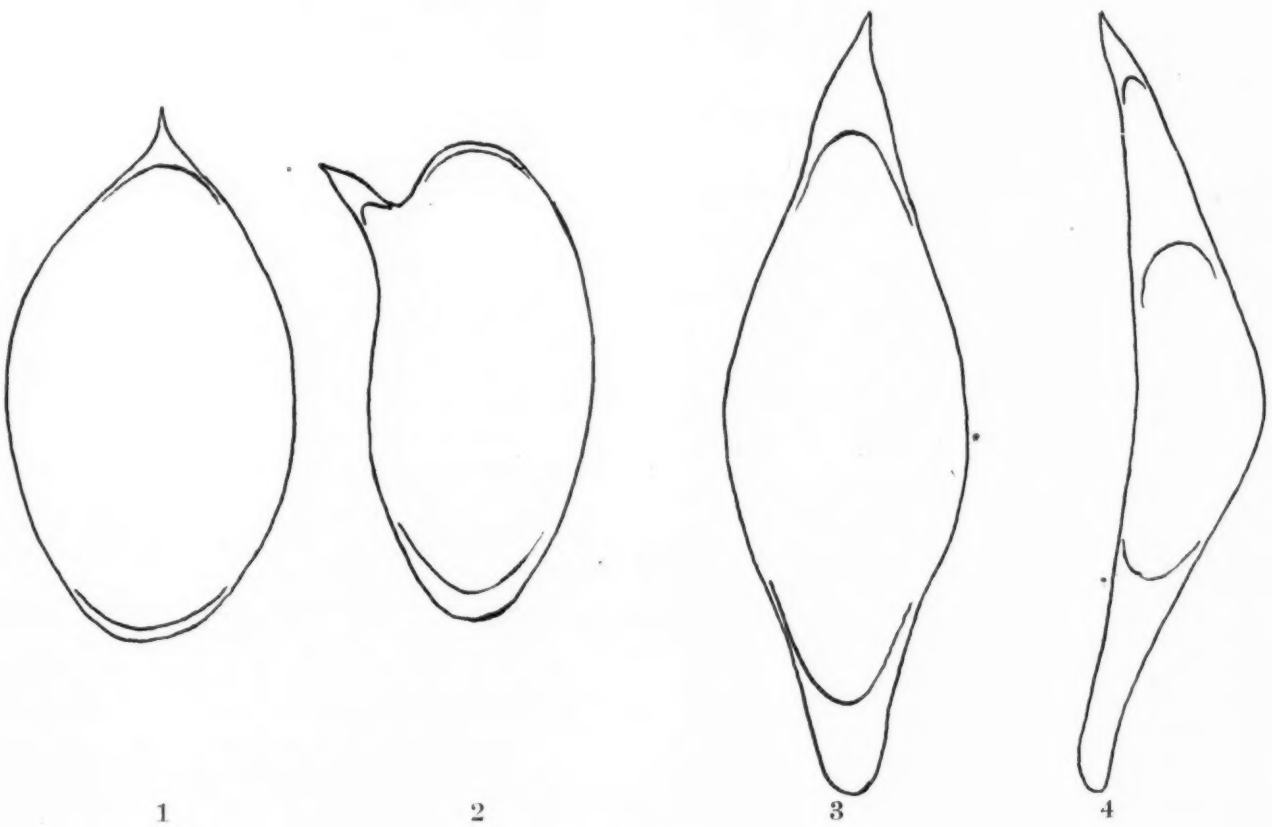

Fig. 1—Ova
1, *Schistosomum hæmatobium;* 2, *Sch. mansoni;* 3, *Sch. bovis?* 4, *Sch. spindalis?*

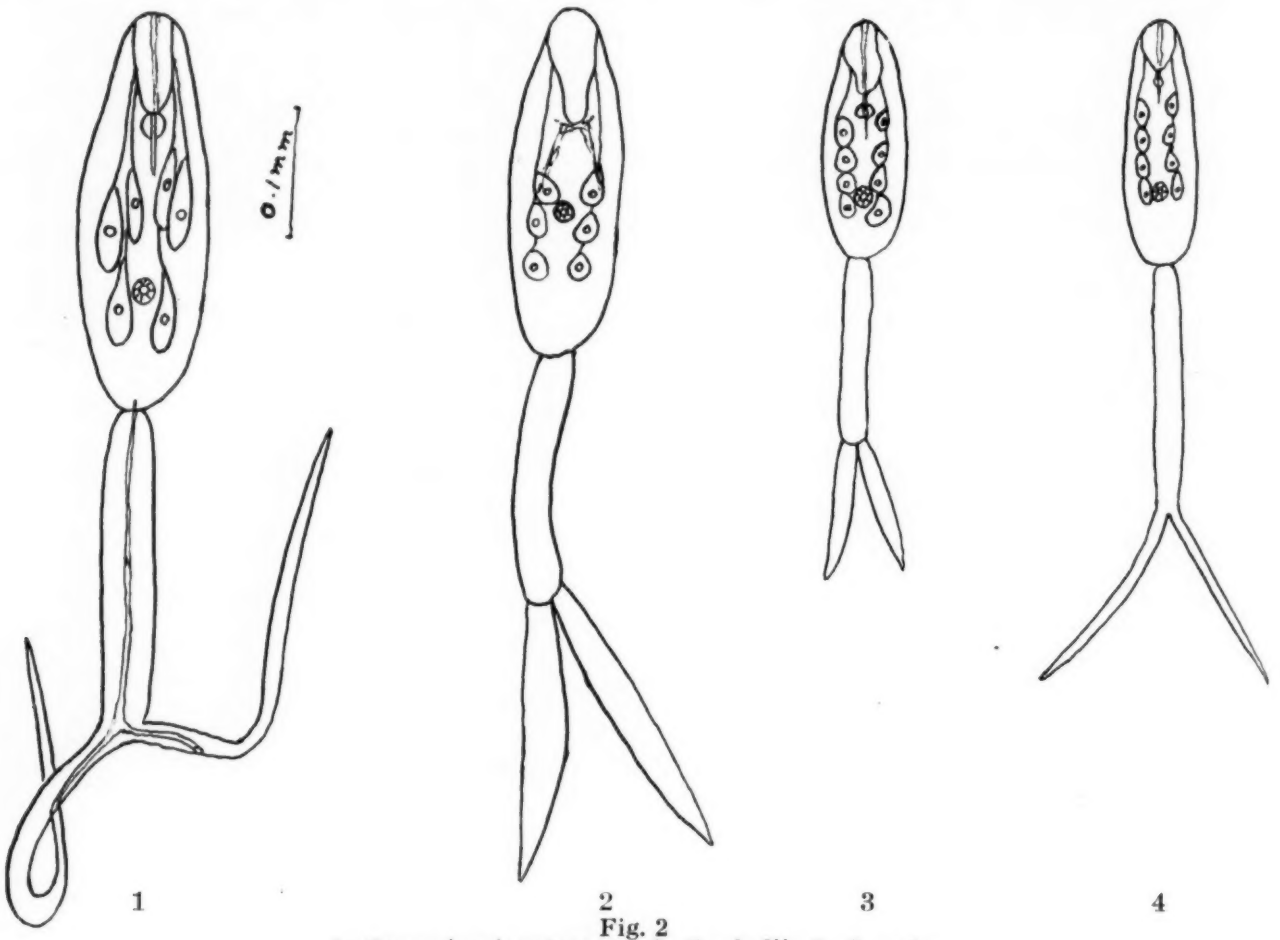

Fig. 2
1, *Cercaria gigantosoma;* 2, *C. gladii;* 3, *C. octadena;* 4, *C. secobii.*

Schistosomum bovis which is an accidental parasite of man.

Only once in 23 years have I found schistosome eggs with a flattened side occurring in human urine along with the usual spine-pointed ones. This occurred in a schoolboy from Zululand. In only about six patients have I observed eggs suggestive of *Schistosomum bovis* in human urine; two or more of these were also infested with both *Schistosomum hæmatobium* and *Schistosomum mansoni.*

We are considered justified in diagnosing infection with the usual schistosomes by the characteristic eggs occurring in human urine or fæces; with the rare schistosomes the identity of the adult worms still remains obscure.

Part of the investigations on this subject have been carried out under a grant from the Streatfield Research Fund of the Royal College of Physicians and of Surgeons.

I have reproduced from Professor E. C. Faust's description of South African larval trematodes four which may represent the adult schistosomes of stock. The outline drawings of eggs represent typical examples of the four distinct kinds I have found in human urine in Natal.

PARLIAMENTARY SCIENCE COMMITTEE: A NEW LIAISON BODY

A Parliamentary Science Committee has been formed by the British Science Guild and the Association of Scientific Workers, with the object of establishing machinery to serve as a liaison body between science and Parliament.

The Chairman of the executive committee is Commander L. O. Bernacchi, and the Vice-Chairman is Professor B. W. Holman.

* * * * *

MEDICAL USES OF RADIUM

The report on the medical uses of radium, which the Medical Research Council has issued annually during several years, was published on Monday of last week. It consists of a summary of reports received from a number of centres where treatment by radium is being given.

A study of these reports suggests that radium is holding its own against other methods of treatment. Thus, in a table dealing with the relative frequency of surgical and radiological treatment, it is shown that, at a series of hospitals which are named, some 44 per cent. of the cases of cancer were treated by radium alone, and only 25 per cent. by surgery alone. Ten per cent. were treated by X-rays alone. The remainder received treatment by combinations of these methods.

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In the first nine months of the year the value of live animals exported from the Irish Free State was £4,923,000 as against £8,907,000 in the corresponding period last year.

THE CONTROL OF JOHNE'S DISEASE*

A. LESLIE SHEATHER, D.Sc., M.R.C.V.S.

The subject I am to deal with was suggested by your President when he invited me to address this Division of the N.V.M.A. Originally my invitation was for a meeting early in the year. At that time I was momentarily expecting to be called to give evidence in a law case, and I was unable, therefore, to accept it. The President very kindly offered to renew the invitation for a date convenient to me, and I am glad to have the opportunity of meeting the members of this Division. I see that I know the great majority of those present.

Having a constitutional objection to reading a paper, I have not prepared a fully written account of what I have to say, but I prefer to speak from my notes.

The first point that calls perhaps for comment is the use of the word " control " in the title of my remarks. It is probably true that " control " of Johne's disease has not yet been achieved, but it is a convenient word to describe such methods as may be employed to check the disease, if not to control it completely.

The first description of Johne's disease which appeared in English veterinary literature was published by Sir John M'Fadyean in 1907, and it may seem perhaps that little progress has been made since then—a period of over a quarter of a century. There are, however, some special reasons why progress has not been as rapid as might have been hoped. In the first place, some time elapsed before methods of cultivation of the causal organism were devised. Secondly, there are no small laboratory animals which can be used for experimental purposes. For experimental research, bovines are the only animals available, and this is no doubt the most important of the reasons for slow progress. Bovines as experimental animals are extremely costly in every way, and the chronic nature of the disease makes research very prolonged. Further, it must not be forgotten that large figures are essential if accurate conclusions are to be drawn from work performed. The problem, as much as every other problem in veterinary research, and more so than many of them, is hedged by £ s. d.

There is no need for me to emphasise the economic importance of the disease. As a disease, the condition is rarely observed in an animal under 18 months of age, and it is perhaps as well that I should draw your attention to the rather different meaning attached to the expression " a case of Johne's disease " by practitioners and laboratory workers. To the practitioner it is the clinical picture that makes it a " case," but to the laboratory worker it is the existence of infection in the animal that makes it a " case."

Experience shows that the period of incubation is frequently prolonged, and it is therefore quite possible that an animal developing clinical symptoms has actually been infected for as much as a year. It is therefore probably incorrect to say that the disease does not occur in animals under 18 months. The fact is that clinical symptoms seldom or never make their appearance before that age. There seems to be a possibility that not every animal which actually contracts the infection becomes a " case " of the disease. This difference between " infection " and being a " case " is seen in other diseases running a chronic course, such as tuberculosis and parasitic gastro-enteritis and others. There is no doubt that not every animal that harbours the tubercle bacillus in its body, and has recognisable lesions, becomes a " case " of tuberculosis; in fact, in many cases the animals appear to " get the better " of their infection. It is not improbable that animals actually infected with the bacillus of Johne's disease never become " cases," and it is equally probable that animals may be " cases " for a time, and subsequently overcome the infection to the extent of keeping it in check to the point of preventing the development of clinical symptoms. I would like to suggest to those who have the opportunity that they should make preparations from the mucous membrane of the terminal part of the small intestine whenever they can, and examine them for the bacillus of Johne's disease. Johne's disease is admittedly a difficult one to detect at *post-mortem* examination in some cases, and the findings are by no means constant as regards the morbid anatomy and the organisms present. There seems to be no necessary relationship between the two. Reference is made to this because it furnishes somewhat of a contrast with what is the case in tuberculosis. While in the great majority of cases it is not difficult to detect tuberculous lesions when they are present in animals that have never reached the stage of being " cases " of tuberculosis, the same is not true of animals infected with Johne's disease at a stage which falls short of being clinical. The point that I want to make is that it is quite conceivable that infection with Johne's bacillus may possibly occur in animals which come under no suspicion clinically, and that such cases may never show symptoms.

The principal reason for the difficulty of detecting the lesions of Johne's disease, as compared with those of tuberculosis, even in a slight case of the latter, lies in the fact that Johne's bacillus produces no destruction in the cellular

* Presented at a meeting of the Southern Counties Division of the N.V.M.A., at Bournemouth, on September 15th, 1933.

tissues invaded by it. Recently Houthuis recorded a case of what he considered to be ulceration of the intestine caused by the bacillus of Johne's disease. I had the opportunity of examining the sections from this case, and I was definitely of the opinion that the ulceration was a pre-existing condition.

In attempts to control or check any disease, diagnosis is the first essential, and it is important that the disease should be recognised by *post-mortem* examination as well as during life. While in the majority of cases of the disease diagnosis does not present much difficulty after death, it must be remembered that the lesions vary very considerably in their extent and distribution, and also that there is no constant relationship between the extent of the lesions and the number of bacilli present. This fact indicates a variation in the degree of reaction on the part of the body to the presence of the bacillus. Whether this is held to be due to varying degrees of resistance or variations of virulence is of no practical consequence. Suffice it that the reaction on the part of the body to the presence of the organism is not constant, and this lends support to the views expressed above regarding the possibility of " infected " animals never becoming " cases," or of recovering in a clinical sense after having shown symptoms.

Diagnosis during life presents very considerable difficulty, and it is here that there is need not only for further investigation, but for the collection of large numbers of records based upon the application of existing techniques employed in diagnosis.

In clinical cases, evidence can sometimes be obtained to support a diagnosis based upon symptoms. It has been advised that fragments from the mucous membrane of the rectum may be examined for the bacilli, but in my experience that is not of very great service, as the disease must be very advanced for the bacillus to have reached the terminal part of the large intestine.

In cases where the fæces have reached the stage of being actually or nearly fluid, it is a very useful procedure to examine these for the presence of acid-fast bacilli. In order to do this the coarse vegetable débris must be removed by straining the diluted fæces through wire gauze, and the fluid must be centrifuged, preparations being made from the deposit obtained.

A good many attempts have been made to prepare an agent analagous to tuberculin for the diagnosis of Johne's disease, and while the matter is still very much in the experimental stage, it would seem that some definite advance has been made. I have had few opportunities of carrying out tests for the detection of Johne's disease, and none at all during recent years, so that I can express no opinion as to the interpretation of reactions. You are all aware that this subject is being dealt with by Dr. Minett at the meeting of the N.V.M.A. at Llandudno, and no doubt you have read what he says in his paper.

I have suggested before, and I put the suggestion forward again, that it would possibly be wise not to anticipate that a reagent as reliable as tuberculin will be prepared for the diagnosis of Johne's disease. My reason for making the suggestion is based on the difference between the two organisms in their power of causing damage to the tissues invaded by them.

A good deal can be done to check the spread of the disease by paying careful attention to the prevention of contamination of food or water by the fæces, and by using the fæces as manure, in the way in which they are least likely to cause the spread of the disease. The important points in this utilisation are drying and exposing to sunlight, and use on arable land.

As to the length of time that the bacillus can maintain its vitality outside the body, it is obviously extremely difficult to furnish any actual evidence, and I do not wish to hazard what could only be a guess.

Discussion

Invited by the President (Captain J. F. D. Tutt) to open the discussion, Mr. N. S. Barron said he was afraid he was hardly capable of arguing many of the points raised by Dr. Sheather, but he had enjoyed his address very much indeed, and had listened to it with great interest. There was one point that interested him, and that was the essayist's diagnosis of cases in the animal before they became what the general practitioner would regard as cases. Dr. Sheather had mentioned various methods by which one attempted to arrive at that diagnosis, such as examining the mucous membrane and the fæces themselves, but there was one method in which the fæces were removed and the rectum made as clean as possible, just by gentle manipulation, then a little saline or warm water was put in, and the bowel manipulated with the fingers, and the fluid afterwards examined for the bacilli. It seemed to him that that would facilitate the finding of the organisms if there were any. There was also another question he would like to ask in connection with what one was up against in the control of this disease. In cases where the ground was known to be infected, how long could they leave the ground before they allowed cattle to go on to it again? There had been some interesting work done—he believed at the National Institute of Dairy Research. He took it they had to work by analogy, and he believed they had found there, with cowpads artificially infected, in summer weather (not quite as ideal as they had had this year, but in ordinary summer weather) that in 95 per cent. of the cases the tubercle organism could not be found after four months, although in a few cases they obtained it at six months. He thought that was rather a useful piece of information they might keep in mind. Personally, he could only repeat that he had enjoyed the paper very much.

Dr. Sheather remarked that, with the President's permission, he proposed to deal with the points as they were raised by different speakers, rather than give a general reply, at the end. He had not had much experience of

lavaging, but on general grounds he did not see why the procedure mentioned by Mr. Barron should be of any advantage, because the whole point of examining the fæces direct was to get to the bacilli that had come down from the small intestine, and unless the disease had progressed to the point of getting down to the tail end of the large intestine, he failed to see that they would be any better off. He thought the experiments at Reading were extraordinarily important. In the absence of anything else they must argue by analogy, and it was much better to say "I will take that as a guide" than to have no guide at all. But he would like to know in what condition the cowpads were left.

Mr. Barron: "Just as cowpads usually are left—exposed."

Dr. Sheather: "I asked that, because it occurred to me that it is rather like looking for the proverbial needle in the haystack. It has been proved, I think, in the case of milk, that a single bacillus will infect a guinea-pig, and to find a single bacillus in a cowpad would be very much worse, because in the milk you have got a fluid medium."

Mr. Arnold Spicer, who was invited to contribute to the discussion, remarked that he had come there rather to listen than to speak, but he would like to congratulate Dr. Sheather on the very informative talk he had given them. With regard to treating these animals in order to recover sufficient weight for them to be slaughtered, he had tried many different remedies, but the action was most uncertain. In three or four cases a cure seemed probable, and then in the next batch one had no results at all. One point he would like Dr. Sheather to explain was why they got a serious outbreak in a herd, and then suddenly the outbreak would die out, and there would be quite a long interval before another case occurred. This was one of those very confusing things which it was difficult to explain.

Then there was the question of the johnin used in the tests. It was very difficult to put any faith in it at the present time. He remembered Major Dunkin coming down and testing some animals, and the first lot of reactions they got were very much like tuberculin reactions. Major Dunkin came down on three occasions, and condemned animals which he did not think he would have condemned himself. Later on, when he tested the same herd himself, he got reactions that were far bigger than, or quite as big as, the majority of reactions one got with the tuberculin, but he could not say that there was very much œdema associated with them. These animals had been fed very heavily on minerals, and he wondered whether that had had anything to do with it.

Dr. Sheather replied that he was afraid he could not answer any questions about tuberculous cows, because he did not come into contact with them, but as a general observation he would like to say that when they were dealing with living things they got endless variations. In cultivating his flasks of johnin, for instance, he found immense variation in the way in which they grew, although the medium was made up every time to a written formula, and was exactly the same every time. The strain he used was actually one of Dunkin's. There was no doubt one got very great variation. One had to have faith in the medium, and he thought there one came up against the point he had mentioned earlier, that unless one obtained a lot of records and a lot of corresponding *post-mortem* examinations, one did not know what to call reactions.

Mr. Spicer commented that that was where the practitioner failed; he could not get the *post-mortem* examinations.

Dr. Sheather added that it was only by the slow collection of records that we should get to know about the treatment. With regard to another point raised by Mr. Spicer, Dr. Sheather said it was a fact that animals that were clinical cases picked up again without any treatment at all.

Mr. J. H. Ripley asked Dr. Sheather if he could give any idea of the average time an animal might be infected in the laboratory sense, before it showed itself as a case, receiving the reply "from a year onwards."

Mr. Caudwell remarked that he would like to hear Dr. Sheather's experience with avian tuberculin. He believed that had now been quite superseded, but he had had enormous reactions from it.

Dr. Sheather said he believed the suggestion with regard to that first came from Denmark, but he pointed out that originally it was thought the bacillus of Johne's disease was actually the bacillus of avian tubercle. That was before it had been recognised as a special entity.

Mr. E. F. Beckett, speaking on the subject of avian tuberculin, said his experience had been that in no single case did they get a reaction, but when they tested with Dunkin's johnin they had about 40 per cent. reactors. The number of animals of one family that went out with the same disease was also an interesting feature.

Dr. Sheather remarked that that supported what he had said, as to the variation in susceptibility. No two animals were alike, any more than two human beings. Chemically they were not all identical. If they were, there would be no question of grouping animals for blood transfusion. He had seen cattle killed in less than 30 seconds as a result of their not getting the right blood group. To return to what Mr. Spicer had said, he thought it a great pity in one way that the intradermal test had come into use, because there was no means of recording their observations exactly. That was one of the "snags." He would rather have to apply the subcutaneous than the intradermal test. In the latter they had got to be the machine recording what they had obtained, and they had to put their own interpretation upon it. That was one of the reasons why it was difficult to get a number of johnin tests which any other man could appreciate in the same way as the man who made them.

Mr. G. N. Gould remarked that he had been very interested in Dr. Sheather's paper, because he had been reading a lot about the disease in recent years. He had recently come across a case in which the whole herd had been slaughtered, the pasture left vacant of cattle, and the land had been harrowed and heavily limed before any cattle had been put on it again, and he had seen a clinical case of Johne's disease there only a few days ago; it would appear from this as if the pasture remained infected for two years. Reference had been made to the treatment of infected animals with a view to their being made fit for market, but he did not think any treatment could be really called economical unless it was where they had a valuable pedigree animal. He thought the only thing to do was to diagnose as early as possible, to eliminate all infected animals, and as far as possible to increase their resistance to the disease; and he found that heavily mineralised feeding, especially

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with milking cattle, was about the best step to take.

Dr. Sheather commented that the circumstances mentioned by Mr. Gould were peculiar, but there was one loop-hole. Were the animals brought back on to the farm, all free from the disease when that was done? He was not a a believer in the mysterious. There must be some rational explanation. It was unlikely that the bacillus would survive for two years in such an amount as to cause another outbreak.

Replying to Mr. J. S. Wood, who asked how the bacillus was supposed to spread, by ingestion or blood transmission, the essayist observed that it was taken in in the food or water, and simply propagated along the walls of the bowels.

Mr. B. Gorton remarked that Dr. Sheather had told them the tubercle bacillus damaged the tissues and damaged the animals, and that Johne's bacillus did not damage the tissues, but did damage the animals. How was this?

Dr. Sheather: "Because of the persistent irritation of the bowels. The cells are stimulated, and there is a constant irritation and pouring out of liquid. The bacillus of Johne's disease has no lethal action on any single cell. What disturbs the health of the animal is the persistent irritation. Its action is something quite different from the action of the tubercle bacillus."

Replying to another question by Mr. J. B. White, who asked if, assuming they could sterilise the bowels of Johne's bacilli, the animal would improve in its condition, Dr. Sheather said he thought copper sulphate acted as an astringent only, and that it had no sterilising action at all.

THE SILVER FOX INDUSTRY

The silver fox industry, which began in this country in 1920, has made progress. It is estimated that there is now a silver fox population of about 4,000, and that over 250 fox farmers and others are concerned in the breeding of pedigree silver foxes. To illustrate the development of the industry a three day's exhibition of the Silver Fox Breeders' Association of Great Britain and Northern Ireland was held recently at the Royal Agricultural Hall, Islington.

"Those engaged in the work are confident of its future," says *The Times*. "The owner of a Sussex farm, who is convinced that foxes bred and reared in the South of England are as good as those produced in the colder North, considers that the results achieved in this country show clearly that the position so far attained is in no wise compatible with its potential abilities. Last year the price of silver fox furs at the London auctions rose steadily and the early sales this year showed a further advance. Not only is there a good demand for pelts, but breeding stock is much sought after. One exhibitor stated that he had received inquiries for breeding stock from no fewer than 26 countries. Foxes cost from £80 to £100 a pair, and it is usual to breed from them for a season or two before they are 'pelted.'"

The exhibition was the eighth to be organised by the association. There were 268 foxes exhibited, a considerable increase compared with the entry at last year's show.

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The licensing of boars is called for by the National Association of Pig Breeders. Closer control over the use of boars is regarded as essential to the improvement of the pigs of this country.

The Veterinary Record

November 11th, 1933.

THE HELMINTHOLOGY OF ANIMAL DISEASE

To observe the laws of true perspective and maintain the proper proportions of his drawing, the artist must avoid the tendency to concentrate too closely on any one part, and occasionally must stand well back in order to view the picture as a whole.

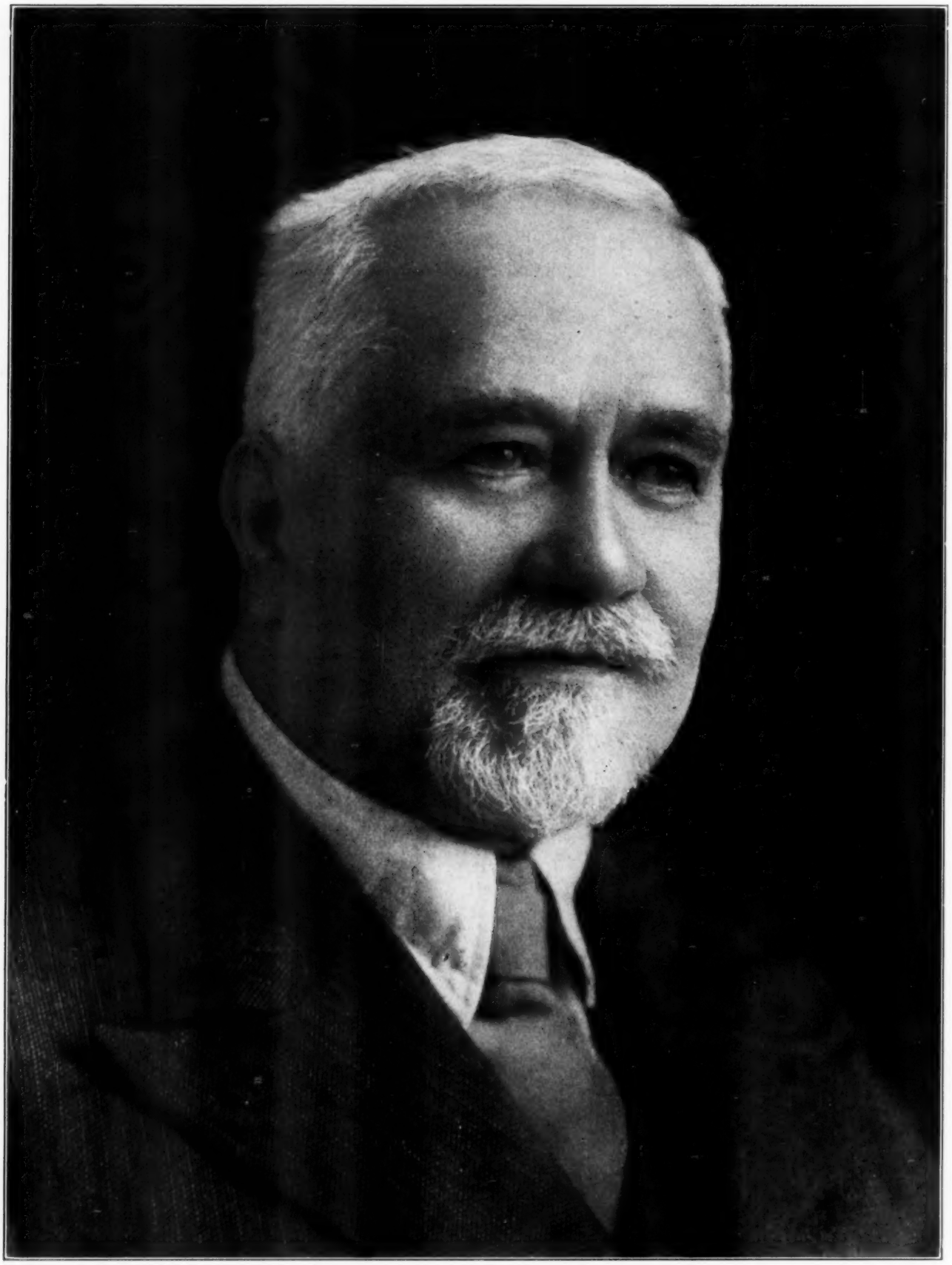
One of the benefits to be derived from a review of "Veterinary Helminthology," such as appears in our issue of this week, is the opportunity thereby afforded to scan the whole subject and observe whether it is progressing along the proper lines.

It will be seen that some parts of the work are much more complete than others; some are but roughly outlined and others scarcely begun. The only part presenting an appearance of finish is that dealing with the systematic biology of the parasites, and although there is still much to be done in this section it presents a certain solidity that is satisfying, and a little pride of attainment may be excused.

Let us not delude ourselves, however, into thinking that that part, along with the study of anthelmintics, represents the whole of this rapidly-growing branch of veterinary medicine, and congratulate ourselves on having done so well. Knowledge of the morphology and physiology of parasites should rather be regarded as the pure science foundation for the establishment of "Veterinary Helminthology" as an applied science concerned with the causation and control of disease induced by parasitic worms—a province as yet almost unexplored.

The point of view is often of great importance, and the outlook of the pure biologist on this branch of veterinary medicine is not the best one for the solution of disease problems. We should not follow blindly the biologist's lead nor confine ourselves to an intensive study of the parasites for their own sake, but rather focus our attention on helminthic disease, its etiology, pathology, treatment and prevention to the full understanding of which a knowledge of the biology of the parasites is only a part.

The diagnosis of infestation by serological methods, the differentiation between pathogenic and non-pathogenic infestations (whether degree of infestation or species of parasite is concerned), the connection between infection with parasitic worms and bacterial invasion, the epidemiology of helminthiasis, the significance of low-grade infestations, the resistance of the host, and many other aspects, as well



PROFESSOR ALBERT CALMETTE

as the expulsion of the parasites by drugs, are all closely associated with animal disease and are therefore our concern.

The review before us shows our subject to be growing out of perspective; we have become so engrossed with the parasite that we have forgotten the disease. It is for those who are trained in the study of veterinary science to correct the proportion, to take up the work so admirably begun, and to carry it on to the fuller understanding of the Helminthology of Animal Disease.

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THE AWARD OF THE FIRST FITZWYGRAM PRIZE TO MISS M. OYLER

THE report, which we publish in this issue, of the Quarterly Meeting of the Royal College of Veterinary Surgeons, will doubtless come to be looked upon as a landmark in the history of the veterinary profession, and, maybe, as a sign of the times in human progress, for one notable announcement, namely, the award on graduation of the blue riband of the profession to a lady student.

Not many years ago, experienced veterinary surgeons would have viewed with grave apprehension the suggested entry of women into the veterinary profession, as, in their minds, the one vocation the practice of which was least suited to the gentler sex, by virtue of its exigencies in temperament, physique and contacts. Times have changed. There may be many of us, not being perhaps ardent feminists, who remain wondering what channels of fruitful activity our young lady colleagues will cleave for themselves within the profession, though, doubtless, there must be several, with the many new developments in what may be termed an applied science and in the public needs. But whatever the existing views of veterinary surgeons may be on such prospects, they will now, we are very certain, all acclaim, with sincere accord, the great achievement represented by the winning this year of the most coveted prize of all the veterinary colleges by a lady. One of the most impressive incidents that we can recall—and one worthy of our profession—was when earlier in the year at the Annual Meeting of the R.C.V.S. the same lady walked up to receive the award of the Walley Memorial Prize at the hands of the President: the sustained applause which then greeted the recipient was a more eloquent tribute from the male members present than any spoken word from them could be to what they appreciate, in achievement coupled with modest charm, in her sex. We wish her a continuous brilliance in her career among us.

OBITUARY

Drs. E. Roux and A. Calmette

In last week's issue of *The Veterinary Record* we had to announce the death on October 29th of the Assistant Director of the Pasteur Institute, Professor Albert Calmette. This week we have the equally regrettable duty of announcing the death of the eminent Director of the same Institute, Dr. Emile Roux. In a forthcoming issue we hope to give some biographical details concerning the late Dr. Roux.

The Late Professor Calmette

An Appreciation

(Contributed)

Calmette was born in 1863. At the age of 20 years he entered the French naval medical service and during the succeeding seven years spent in this service he developed a taste for the then new science of bacteriology. In 1890 he entered the Pasteur Institute in Paris and shortly afterwards, at the instigation of Pasteur himself, he was appointed to take charge of the institute at Saigon in French Indo-China. While at Saigon his most noteworthy researches were concerned with rabies, for which disease he instituted the Pasteur treatment, and with the development of antivenin for the treatment of snake-bite. In 1895 Calmette was appointed Director of the newly-established Pasteur Institute in Lille, where over 20 years of his life were spent. One problem which he successfully tackled at Lille was that of hookworm disease, which at that time was causing much illness among the miners in Northern France. The work, however, for which he will ever remain famous, was that connected with tuberculosis. Following upon failure to immunise animals with dead tubercle bacilli, Calmette was persuaded that the most profitable line of enquiry was to make use of living cultures which had been deprived of their virulence. This Calmette succeeded in achieving by a prolonged series of subcultivations on glycerine potato containing ox-bile. His next step, in collaboration with the well-known veterinarian Dr. C. Guérin, was to make tests upon animals with this non-virulent culture, which is now familiary spoken of as the B C G vaccine. At this point the war broke out, and although Calmette remained in Lille during the German occupation, progress with animal experiments became impossible. During this period, however, he found time to complete his comprehensive and widely-read book entitled "Tuberculosis in Man and Animals."

In 1917 he was appointed Assistant Director of the Pasteur Institute in Paris under E. Roux, although he remained in Lille until after the war. As soon as an opportunity arrived, experiments on cattle with B C G were again put in

hand by Calmette and Guérin and these demonstrated clearly that the vaccine was capable of immunising bovine animals. The authors always held the view that this state of induced resistance would prove a valuable aid in suppressing bovine tuberculosis, though it must remain for the future to say to what extent their expectations will be realised. The earlier experiments gave Calmette the firm conviction that the B C G vaccine was both immunising and devoid of the power to regain virulence in the body. Hence, it was not long before a trial of the vaccine was made upon human infants born in conditions where they could scarcely escape natural infection, and between 1921 and 1924 the vaccine was given by the mouth and without ill effect to 321 such infants. Since 1924 more than 1,000,000 human beings have been vaccinated with it, and in France, where most of the work has been done, few doubt its efficacy. In order that the vaccine might be prepared under more suitable surroundings, as well as for purposes of research on tuberculosis, a new building was erected in the grounds of the Pasteur Institute, Paris, a few years ago. During the last few years the movement for more general use of the vaccine received an undeserved setback by a disaster which occurred in Lübeck in Germany. It was decided at Lübeck that the method should be given a trial, and for this purpose a consignment was obtained direct from the Pasteur Institute. Some time elapsed between the receipt of this consignment and the administration of it to infants, but unfortunately shortly afterwards those who had been vaccinated began to die. In the meantime, the remaining cultures had been destroyed. What happened exactly will never be known, but from the subsequent investigation it was established that Calmette was in no way responsible and it seems probable that by a misunderstanding in the laboratory at Lübeck a virulent culture of human tubercle bacilli had been mixed with the harmless B C G culture. This distressing episode led to much recrimination, but Calmette bore with patience the personal attacks which were made against him, his sole concern being whether a fault could be found with the vaccine which had been tested by him and others with such unremitting care.

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PROFESSOR MORKEBERG

Professor Morkeberg, director, since 1928, of the Royal Veterinary and Agricultural College, Copenhagen, died after a short illness on September 11th shortly before attaining 70 years of age.

Born in 1863, he passed his veterinary examination in 1884, and after a few years in practice returned to the College to take up the post of teacher of surgery. In 1903 he became professor with the surgical clinic in his charge. He soon became prominent, abroad as well as in Denmark, his energy and industry being very great. This was in the pre-war days when draught horses were most numerous.

Professor Morkeberg made many contributions to veterinary surgery in the large domestic animals and commendably left published records of his work by periodical contributions to the *Maanedsskrift für Dyrlaeger,* etc., which were often reproduced in one of the most important German veterinary periodicals. He contributed to some German veterinary-surgical textbooks also, but his life's work was his "Haandbog ir Veterinaerkirurgi," a splendid work in Danish of which three volumes have appeared. It is to be hoped that the work can be completed posthumously.

It is perhaps particularly noteworthy that plastic surgery, hitherto neglected, was studied and elaborated by Morkeberg.

Professor Morkeberg was honoured outside his own country by Sweden, Finland, France, England and the United States of America—by the award of an order or honorary associateship.

The name of Morkeberg is sure to find an honoured place in the annals of veterinary science.

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PROPOSED CENTRAL VETERINARY SCHOOL FOR AUSTRALIA

The *Sydney Herald* reports that State-wide support for a central veterinary school in Sydney to train officers for service throughout Australia, was suggested by Dr. H. E. Albiston, of Victoria, in his presidential address at the annual meeting of the Australian Veterinary Association.

"It is of far greater value to have a single well-equipped veterinary school than to divide the responsibility between two States, with the possibility of a lessening of efficiency in each school," he said. "The Sydney Veterinary School now holds the position of maximum importance. While its location in Sydney might be considered merely accidental, nevertheless, the whole of Australia is vitally concerned with its well-being.

"All the States have a responsibility for the financial maintenance of such a school, as at the moment replacements in State veterinary services must be supplied by recruits from the Sydney school, because the Melbourne school has been closed as a teaching organisation," said Dr. Albiston.

"If the Sydney school were supported by the whole of Australia, and thus made a national veterinary school, it would be better than re-opening the Melbourne institution or starting one in Adelaide," he added.

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Durham County Agricultural Committee has decided to support a resolution of the Denbigh County Council urging the Ministry of Agriculture to revert to the old method of payment of compensation for pigs destroyed under Swine Fever Orders.

They were of the opinion that such a course would be of considerable assistance in the stamping out of the disease and would conduce to earlier reporting of suspected cases.

Clinical Reports

RENAL CALCULI IN A PEKINGESE*

W. CAUDWELL, F.R.C.V.S.
Bournemouth

I received a telephone call one evening, requesting my immediate attendance to examine for the first time a Pekingese bitch about nine years old that was said to have been taken suddenly ill. I found that she was unable to stand and in a comatose condition; her temperature was about or below normal and there was a slight discharge of blood from her vulva.

Palpation of her abdomen revealed an empty bladder and rectum and there was no evidence of purulent metritis. Symptoms of uræmia enabled me to suspect the existence of renal disease and approaching demise. I advised the application of heat to her loins and her body to be kept warm.

On the following morning the owner 'phoned to say that the bitch had died during the night. *Post-mortem* examination revealed the left kidney enlarged to the size of a hen's egg, with blood extravasations under its peritoneal covering and in its cortex. The pelvis of the kidney contained two smooth calculi; one 11 mm. and the other 9 mm. in diameter, and also some sabulous material and pus. The right kidney was very atrophied and contained one small calculus in its pelvis, and it seems to me probable that this kidney ceased to function in early life. The bladder was empty and normal and no obstruction was found in the ureters.

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SYMPTOMS FOLLOWING OVARO-HYSTERECTOMY

J. R. BAXTER, M.R.C.V.S.,
AND
A. J. BAXTER, M.R.C.V.S., D.V.S.M.
Lechlade, Glos.

The patient, a young, smooth-coated terrier, was operated on by A. J. B. on May 5th last; recovery was quite uneventful and the operation wound healed by first intention. When the operation took place the ovaries were found to be slightly congested and "heat" was apparently just commencing.

Subsequent to the operation there was a brownish discharge from the vulva, which persisted, despite treatment, till the first week in September, when the bitch was apparently quite normally "on heat," except that dogs took no notice at all; this "heat" lasted nearly 14 days and since then everything has cleared up and there has been no discharge of any sort.

This case is reported as the post-operative condition appears to be rather unusual.

* Case reported to the Southern Counties Division, N.V.M.A., at Bournemouth, September 15th, 1933.

Abstracts

[The Preparation of Johnin from a Synthetic Medium without the addition of *B. PHLEI*. Dunkin, G. W. (1933.) *J. Comp. Path. & Ther.* *46* (3). Pp. 159-164. Charts 4, refs. 7.]

The author states that over 250 veterinary surgeons have recorded results from the double intradermal use of johnin prepared from the mixed cultures which were the satisfactory outcome of his endeavours to secure a good, uniform and reasonably luxuriant growth on a liquid medium. From these reports it would appear that the johnin described has played a useful part in the detection of Johne's disease in its early stages, and in a few instances has allowed the owner to commence eradication measures.

The occurrence, however, of non-specific swelling at the site of inoculation, of such dimensions and characters that it has been confused by inexperienced practitioners with a true reaction, rendered it highly desirable to eliminate the cause of this misleading reaction. It is stated to be an occasional manifestation which accompanies the use of *B. phlei* or other acid-fast organisms the addition of which to the medium is regarded as essential, and the concentrated broth employed by the author (1928) would sometimes produce such a swelling.

Working with a synthetic medium described by Henle (the composition of which is given) but from which *B. phlei* had been withdrawn, Dunkin succeeded in obtaining a growth of the bacillus of Johne's disease which, though sparse, enabled a johnin not of high potency but possessing allergic activity, to be produced, as shown by the tests applied on four selected bovines. The charts show that in the case of reacting animals all three johnins used (ordinary, and synthetic with and without *B. phlei*) gave positive results, whereas the control medium produced a pea-like swelling impossible to be confused with a true reaction.

Further tests in the field are contemplated as soon as arrangements can be made.

W. B.

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[Necrosis Affecting the Plantar-Cushion in the Horse. (Trans. title.) Faure. (1933). *Recueil de Méd. Vét. de l'Ecole d'Alfort*, cix, No. 8, 467-468.]

The author describes two cases in which loss of adhesion of cushion occurred, and simple palliative treatment merely delayed cure. The radical operation of complete resection of the plantar cushion had to be performed, but this caused a loss of elasticity following healing, the latter process taking upwards of two-and-a-half months.

C. V. W.

[**Concerning the Compulsory Pasteurisation of Milk.** Bonjert, J. *Tierarztliche Rundschau*, No. 13, Mar. 26, 33.]

In response to a request by the authorities in Danzig, Professor Bonjert gives his views as to the advisability of that town introducing compulsory pasteurisation. He refers briefly to the regulations concerning pasteurisation in Germany and points out that, although the holding process, which is at present in force, was at the time of its inception thought to provide adequate protection against various milk-borne infections, this has not proved to be the case. In the summer time particularly, milk so treated develops an unpleasant taste and smell which has mitigated against its consumption.

Many of the processes in vogue up to recent times have been such that the risk of contamination has been greater than if the milk had been sold raw. The vitamins were, to a large extent, destroyed, as were also certain natural immune bodies.

The possibility of infants developing scurvy when fed entirely on pasteurised milk which is again subjected to heat after being bought, should not be overlooked. Milk should in all cases be clearly labelled.

Owing to the reduced cost of fuel consumption there has been a tendency for large combines and others to adopt the rapid method of pasteurisation, holding the milk momentarily at 85°-90°C. Milk so treated is indistinguishable from raw milk, and if allowed to stand for ten hours the cream line will form. Typhoid and paratyphoid organisms and *M. tuberculosis* are destroyed. This product has been used with some success for rearing calves free from tuberculosis, but to it must be added something, such as carrot juice or minced cabbage, to supply the accessory factors.

For various reasons, economic and otherwise, the author does not recommend compulsory pasteurisation for Danzig, and emphasises the fact that the whole story of clean, safe milk is not embodied in the word pasteurisation. To ensure a safe and wholesome product hygienic measures must be observed from the first.

N. S. B.

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[*BR. ABORTUS* **Infection as a Predisposing Factor in the Occurrence of Mastitis and Diseases of the New-born.** Riedmüller, L. *Schweiz. Archiv f. Tierhlk.*, 1933, Vol. 75, No. 6.]

It is a well-known fact that in herds of cattle, particularly milk and breeding herds, which are infected with *Br. abortus*, other infections are common. The author, working at the Veterinary Pathological Institute of Zürich University, here makes quotations from the relevant literature and presents his own results in this field. Several workers have noticed that mastitis is common in *Br. abortus*-infected herds and the recent increased attention paid to the agglutination test of milk has shown that udder infection is much more common than was previously supposed. This infection often causes no clinically discernible mastitis, but is often associated with an increased cell content and chloride content and a fall in the milk sugar. It may give rise to a brief attack of slight mastitis, which tends to clear up after a short time.

With regard to concomitant streptococcal mastitis, Simms noticed 31 cases of mastitis among 44 cows affected with contagious abortion and only two mastitis cases among 27 uninfected cows of the same herd—over an observational period of three years.

During the last year the author has tested all samples of milk sent in for mastitis diagnosis in addition for *Br. abortus* infection by milk serum agglutination, and found 21 positive cases amongst 213 cases of mastitis and 45 positive cases amongst 343 samples in which the bacteriological examination was negative. These positive cases, indicating *Br. abortus* infection, totalled 11·5 per cent. of all samples sent in. In 21 of the positive *Br. abortus* milk cases it was possible to test the blood also and the results were positive in 20 cases.

Brief reference is made to the connection between contagious abortion and sterility. The opinion in the positive sense is by no means universal.

With regard to contagious abortion and coliform diarrhœa in calves, it has long been known that the intra-uterine infection with *Br. abortus* causes inflammation of the alimentary tract in the fœtus and it is agreed that such predisposes to secondary infection after birth (*B. coli*). The author relates the history of an outbreak of new-born calf disease, which was traced by bacteriological evidence to *Br. abortus* infection introduced by a bull. There were no abortions at first, but four of the first five calf offspring of the bull died after a few days from coliform infection. Abortions did occur later in cows served by this bull. The dams of the four calves reacted positively to the agglutination test.

J. E.

For failing to keep an authentic record of the movement of animals for a year, thereby not complying with the Movement of Animals Record Order, Adrian G. W. Meade, farmer, Hunters' Lodge, Clyst Hydon, was fined £20 and costs at Cullompton.

Defendant was also fined £1 and costs for moving eight pigs from Wiltshire into Devon without a licence.

Inflicting the fines the Chairman (Mr. H. G. New) observed that the Act was intended for the protection of farmers against disease, and it was very important in case of an outbreak that the police might be able to trace the movement of animals.

Reports

Nyasaland Protectorate

Report of the Veterinary Department for the Year Ending December, 1932.

This report is presented by Mr. D. O. Turnbull, D.S.O., M.R.C.V.S., who, with Messrs. de Meza, Culhane and Anderson, and two European stock inspectors, together with 70 native veterinary assistants, eight native veterinary police and 146 dipping tank labourers, has been chiefly occupied in lowering the incidence of disease, suppressing outbreaks, and bringing about improvement in livestock, in the interest of the native stock owners of the territory. The castration of superfluous bulls, especially weedy and under-sized animals, has been advocated, the operation being carried out largely by the native veterinary assistants, who have also undertaken the treatment of animals suffering from worm infestation and trypanosomiasis. Fortunately, or unfortunately, the provisions of Section 17 of the Veterinary Surgeons' Act do not obtain in Nyasaland.

The dipping of cattle has involved considerable labour and supervision: the number of dipping tanks in regular use throughout the year being 101, of which 47 were Government controlled. Over 2,000,000 cattle passed through the tanks. It is worthy of record that of these the mortality which could be attributed to arsenical poisoning was 20 head, but only 14 were definitely proved to have died from this cause. As many as 1,655 samples of "wash" were tested during the year.

It is recorded that the majority of native stock owners are ignorant of the ætiology of specific diseases of livestock and the means by which infection is spread. Also, speaking generally, they have little or no faith in the measures adopted in disease control, with the result that there is a marked tendency to conceal rather than report disease. Also it is with the utmost difficulty that they will render assistance even in the catching of animals to be treated and restraining them while under treatment. The work of the Department, therefore, is rendered more difficult and would appear to be a somewhat thankless task. The success achieved under such difficulties is all the more praiseworthy.

African coast fever is enzoötic in most districts of the Northern Province and is responsible for a heavy mortality in calves, although a certain number of adult animals succumb. Anthrax occurs sporadically, but no cases of this disease or of quarter evil have been recorded for several years. Bovine tuberculosis is also conspicuous by its absence. Rabies was first diagnosed in 1915 and since then has occurred annually, chiefly in dogs, although cats, cattle and sheep have been known to be infected. Distomiasis is encountered more commonly in cattle than in sheep, but is rarely responsible for mortality except in old animals. *Hæmonchus contortus* and *Ascaris vitulorum* are the most common intestinal parasites and are responsible for a heavy mortality in calves. A long list of diseases shows the importance of the veterinary service to the progress of the territory.

Ll. E. W. B.

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Royal (Dick) Veterinary College, Edinburgh

In the report for session 1932-33 submitted by the Principal to the Board of Governors of the Royal (Dick) Veterinary College, Edinburgh, reference is made to the fact that, despite the increase of the length of the curriculum, the number of students in attendance established a record so far as available statistics afford information. It is probable that the existing depression in trade may account for the increased number of those entering the College for the first time. Parents and guardians apparently regard the profession as offering promising careers for those for whom they are responsible, and note the absence of overcrowding in the veterinary profession. Students attending courses of instruction came from Scotland, England and Wales, Ireland, India, Uganda, Kenya, Ceylon, Palestine, Siam, China, Spain and Turkey.

The session has also been remarkable for an increase in the amount of material available for clinical teaching.

During the summer of 1932 additional laboratory accommodation was provided for the Department of Diseases of Poultry. The work of the department, largely of a diagnostic and preventive nature, has developed with notable rapidity during the last few years, and further expansion has occurred during the session under review.

SLAUGHTERHOUSE REFORM

The Model Abattoir Society has chosen the Report of the Committee appointed by the Prime Minister in 1931 to consider "whether the present arrangements for the slaughtering of livestock for food are satisfactory from the economic standpoint" as the subject of the Twelfth Annual Benjamin Ward Richardson Memorial Lecture to be given on November 30th, at 5.30 p.m., at the Royal Sanitary Institute.

Professor J. Harry Jones, of the Department of Economics, Leeds University, a member of the Committee which issued the Report, has consented to give the lecture.

Admission is free and no tickets are required.

ROYAL COLLEGE OF VETERINARY SURGEONS

QUARTERLY MEETING OF COUNCIL

A Quarterly Meeting of Council of the Royal College of Veterinary Surgeons was held at 10, Red Lion Square, London, on Friday, October 6th, 1933, at 2 p.m., Professor S. H. Gaiger, President, occupying the chair. The following members were present: Major J. Abson, Dr. O. Charnock Bradley, Captain J. C. Coleman, Professor J. F. Craig, Mr. P. F. Dolan, Major G. W. Dunkin, Messrs. J. Holroyd, R. Hughes, Major W. H. Kirk, Messrs. G. H. Livesey, G. H. Locke, Professor J. Macqueen, Major A. B. Mattinson, Captain T. M. Mitchell, Dr. J. Share-Jones, Dr. A. Leslie Sheather, Lieut.-Colonel P. J. Simpson, Captain R. Simpson, Captain W. K. Townson, Colonel G. K. Walker, Dr. A. W. Whitehouse, Mr. John Willett, Professor G. H. Wooldridge, Captain W. G. Wragg, Lieut.-Colonel T. Dunlop Young. In attendance: Dr. Fred Bullock, Secretary and Registrar; Mr. R. V. Thatcher, Solicitor.

Minutes.—The minutes of the previous meeting, which had been printed and circulated, were taken as read and signed as correct.

Obituary.—The Registrar read the list of Fellows and Members of the College whose deaths had been reported during the quarter.

The members stood while the list was being read.

Admissions to Membership.—The Registrar read the list of new members admitted to the College since the previous Quarterly Meeting.

Correspondence.—(1) From the following members, apologising for their inability to be present: Lieut.-Colonel Brittlebank, Professor Buxton, Professor Hobday, Mr. J. W. McIntosh, Major Spreull, Mr. Donnelly, Mr. Nairn and Mr. Dodd.

(2) From Mr. Trevor Spencer and Major Rabagliati, former members of Council, in response to letters sent on behalf of the Council expressing the thanks of the Council for their past services.

The Secretary read the letters, expressing the appreciation felt by the writers for the action of the Council and their regret at no longer being able to meet their colleagues at meetings of the Council.

(3) From Miss Lloyd, in appreciation of the receipt of the condolences of the Council on the death of her father, Mr. J. S. Lloyd.

Reports of Committees

Finance and General Purposes Committee.

Mr. G. H. Locke read the following report of the meeting of the Finance and General Purposes Committee held on October 6th, and moved that it be received and adopted and all necessary orders made thereon:—

Chairman and Vice-Chairman.—Mr. J. W. McIntosh was re-appointed Chairman and Mr. G. H. Locke Vice-Chairman, for the ensuing year.

In the absence of Mr. McIntosh, Mr. Locke took the chair.

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Report of House Sub-Committee.—(*a*) The following report of the meeting of the House Sub-Committee on October 4th was read and, after amendment, adopted:—

> The Secretary reported the result of his inquiries with a view to obtaining additional accommodation and was instructed to continue his investigations.
>
> The Secretary was authorised to consult with the General Post Office with a view to providing a more efficient office telephone service.

(*b*) It was resolved that the House Sub-Committee be authorised to extend their enquiries as to the possibility of obtaining suitable accommodation in districts outside Red Lion Square.

Financial Statement.—The Treasurer submitted his financial statement for the quarter, showing an adverse balance of £9 16s. 3d.; £1,000 on deposit, and liabilities amounting to £70 18s. 11d.

The Treasurer's statement was adopted, and he was ordered to pay the liabilities shown, together with cheques for current expenditure.

Investments.—The Treasurer reported that, as instructed, he had made the following investments:—

> £502 2s. 11d. Conversion Loan 3½% Inscribed Stock @ 99 5/16 ... ... £500 0 0
> £486 10s. 4d. Derwent Valley Water Board 3½% 1953/63 Stock @ 102¼ ... £500 0 0

Annual Fees.—The Secretary submitted four cases of members in arrears with annual fees and was instructed as to the procedure to be adopted.

Gift of Landseer Pictures.—The Secretary reported that he had ascertained that the Landseer pictures presented to the College require reframing, and he submitted an estimate for the work to be done at a cost of £10.

It was agreed that the pictures should be taken out of their frames and carefully packed and stored, the Secretary being instructed to arrange for their storage and insurance.

Examiners' Fees.—The question of the amount of fees and expenses paid to examiners under the five years' course was considered and it was resolved "That the matter be referred to a sub-committee consisting of the Chairman and Vice-Chairman of the Examination, Finance and General Purposes Committees together with the Treasurer and Mr. Holroyd."

Examiners in Animal Husbandry.—The fee payable to the examiners in Animal Husbandry, Part I, was fixed at 7s. 6d. per student.

Major Abson seconded the motion, which was carried unanimously.

Examination Committee.

Professor J. Macqueen (Chairman) presented the following report of the meeting of the Examination Committee held on October 5th, and moved that it be received and adopted:—

Chairman and Vice-Chairman.—Professor J. B. Buxton was appointed Chairman, and Professor J. Macqueen Vice-Chairman of this committee for the ensuing year.

In the absence of Professor Buxton, Professor Macqueen took the chair.

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Report of D.T.V.M. & H. Sub-Committee.—The Secretary reported that the sub-committee appointed to draw up regulations for the award of the Diploma in Tropical Veterinary Medicine and Hygiene had, at a meeting held on Wednesday, October 4th, completed their consideration of the draft regulations, and that a copy of the draft would be circulated to the Examination Committee prior to the next Quarterly Meeting.

July Examinations.—Reports on the examinations held in July were submitted from the Chairman of the Board of Examiners and delegates. It was resolved:—

(*a*) "That the reports be accepted, and that the thanks of the Council be addressed to those persons and institutions from whom assistance had been received in the conduct of the examinations."

(*b*) "That at the forthcoming December examinations the Oral Examinations in Liverpool may if found desirable follow on those held in Dublin."

(*c*) "That the following note included in the report of the Examiners in Class "D" be circulated to the Principals of the schools for their information: 'An increasing tendency in candidates to prescribe toxic doses of poisonous drugs is noticed.'"

(*d*) "That the report submitted by Professor Buxton be circulated to the Principals of the schools for their information, the Secretary first having obtained Professor Buxton's consent to this course."

(*e*) "That the report on the examination in Animal Husbandry and Stable Management be submitted for consideration and report to a sub-committee consisting of the President, Chairman, Vice-Chairman, Mr. Livesey, Mr. Male and Professor Wooldridge."

Colonel Walker gave notice that at the next meeting of the committee he would move that for the examination in Surgery the Council should appoint three external examiners.

Fellowship Examination.—The Secretary reported that three entries for the Fellowship Examination had been sent in, and that the Examiners' reports on two of them had been received as follows:—

No. 91.—"That the thesis as submitted is not acceptable, but that the candidate be given the option of re-writing the thesis in order to present the subject again in his own words and embracing only his own work."

No. 94.—Thesis submitted by H. S. Caldwell entitled "Clinical Observations on Lactation Tetany in North Staffordshire." After an examination of the thesis and an oral examination, the Examiners recommend "That this candidate be awarded the Fellowship Diploma."

It was resolved "That the Examiners' reports be approved and that the Fellowship Diploma be conferred on Mr. H. S. Caldwell."

Educational Certificates.—(*a*) The Secretary submitted a list of Educational Certificates Nos. 4219-4301, 4305-4309, 4311-4336, 4342-4356, 4359-4368, which satisfied the requirements of the College and had been accepted.

(*b*) Special applications. Applications from candidates holding educational certificates differing from those set out in Schedule I were submitted, and the certificates were accepted in the following cases: Nos. 4340, 4341, 4372-4375.

Applications for Concessions.—(*a*) A student who had failed in one subject at the December Examination, 1932, had again failed in that subject in July, and proposes to sit again for re-examination in December next, applied to be allowed to sit for examination at the same time in the subjects of the next year's course. It was resolved "That the application cannot be acceded to under the Bye-laws."

(*b*) A request was submitted for an interpretation of Bye-law 61 in the case of students who, having attended two terms at one school, wish to complete their 30 weeks' study by attendance at another school. It was resolved "That by the provisions of Bye-law 61 students must attend one complete session at one only of the affiliated schools before being eligible for examination."

Bye-law 62.—(*a*) Applications for exemption under Bye-law 62 were considered and it was resolved "That exemption be granted in the following cases: Nos. 4302, 4303, 4304, 4310, 4337-4339, 4357, 4358, 4370, 4371."

(*b*) Applications were received from six students for the recognition of the Higher School Certificate in the subjects of Chemistry and Physics, Botany and Zoology, as entitling them to exemption under Bye-law 62. The Secretary submitted at the same time a report from Dr. Lander and Dr. MacDougall on the syllabuses in the respective subjects of the examining bodies for the Higher School Certificates. It was resolved:—

(i) "That the Secretary be instructed to inform the present applicants that the Higher School Certificate will be accepted as entitling to exemption under Bye-law 62, if it shows that they have passed in Chemistry and Physics and Biology as *group subjects.*"

(ii) "That the report submitted by Dr. Lander and Dr. MacDougall be referred for consideration and report to the sub-committee appointed in July Examinations, paragraph (*e*).

FitzWygram Prize Award.—The Secretary submitted the report of the auditors on the marks gained by the students eligible for the FitzWygram Prizes, showing that Miss M. Oyler, of London, had obtained the highest number of marks, namely, 693, and that Mr. G. A. Durham, of Edinburgh, had obtained the second highest number, namely, 669. It was resolved:—

(*a*) "That the First and Second FitzWygram Prizes be awarded respectively to Miss M. Oyler and Mr. G. A. Durham."

(*b*) "That the Secretary be authorised to publish in *The Veterinary Record* the names of the first ten candidates eligible for the FitzWygram Prizes, in order of merit.

The names are as follows:—

Name.	*School.*
Oyler, Miss M.	London
Durham, G. A.	Edinburgh
Fraser, J. M.	Edinburgh
Macauley, J. W.	Glasgow
Graham, J.	Edinburgh
Ormerod, Miss M.	Liverpool
Swann, H. C.	London
Hulse, E. C.	London
Morgan, K. G.	London
Kelly, Alex.	Edinburgh

Walley Memorial Prize.—The Secretary submitted the auditors' report on the marks gained by students at the written examinations in Pathology, Materia Medica and Hygiene, held in December, 1932, and July, 1933, showing that Mr. J. K. S. Elmslie, of Edinburgh, had obtained the highest number of marks, namely, 104. It was

resolved "That the Walley Memorial Prize be awarded to Mr. J. K. S. Elmslie."

Appointment of Local Secretaries.—Applications for appointment as Local Secretaries were considered, and it was resolved to recommend the making of the following appointments: Edinburgh, Mr. A. K. Cameron; Glasgow, Mr. J. M. Mitchell; Liverpool, Mr. R. S. White; Dublin, Mr. J. Doyle.

Adjournment.—At this point it was resolved that the committee adjourn until after the meeting of the Registration Committee, to be held in the afternoon of the same day.

On resuming its sitting at 7.15 p.m., the following members were present: Professor Craig, Major Dunkin, Mr. Holroyd, Mr. Livesey.

Professor Craig was appointed to the chair.

Appointment of Reserve Examiners.—(*a*) The question of drawing up a list of Reserve Examiners was considered. It was resolved "That for the convenience of the President it is desirable that a list of gentlemen suitable for appointment as Examiners in an emergency should be drawn up."

A list was considered and, after amendment, the Secretary was instructed to make further enquiries, and to submit a revised list to the committee at its next meeting.

Examiners' Fees.—(*a*) The question of the appropriate fee to be paid to the Examiners in Animal Husbandry was considered, and it was resolved to recommend for the favourable consideration of the Finance Committee: "That the same fee be paid to the Examiners in Animal Husbandry as in the case of Stable Management, namely, 7s. 6d. per student."

(*b*) The general question of fees payable to Examiners under the Five Years' Course was referred to the Finance Committee.

Jubilee Memorial and Bursary Prize.—The Secretary reported that no entries had been received for the Jubilee Memorial and Bursary Prize.

Students' Examination Fees.—The recommendation of the Finance Committee that students' fees should be paid direct to the R.C.V.S. four weeks in advance was submitted, but the consideration of the matter was deferred.

Mr. R. Hughes seconded the motion and the report was adopted.

Registration Committee.

The Secretary read the first report of the meeting of the Registration Committee held on October 4th, as follows:—

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Cases Against Unregistered Persons.

N.22A.—"Canine and Feline Specialist"; "late R.V.C." The Solicitor reported that he had given instructions that the letters "R.V.C." must no longer be used by Mr. Cole and when printing labels in future the letters R.A.V.C. or any similar title must be omitted. He was directed to watch the case to see that his instructions are carried out.

N.87.—"Veterinary Specialists." A satisfactory undertaking was submitted in this case.

N.88.—Using letters "M.R.C.V.S." An explanation was received and the case was ordered to be held over pending an enquiry by the committee as to the conduct of the member involved.

N.89.—"Animal Practitioner"; "Dog and Cat Specialist." A satisfactory explanation was received in this case.

N.90.—"Veterinary Surgeon." A satisfactory undertaking was received in this case.

N.91.—"Veterinary Advice" on notice-boards. The Secretary reported that he had been informed that the offence had been discontinued.

N.92.—"Canine Specialist"; "Animals treated." This matter was left in the hands of the Solicitor with a view to obtaining further evidence.

N.93.—"Canine and Feline Medicines supplied under Veterinary Supervision." An undertaking was submitted in this case which was accepted.

N.94.—"Canine and Feline Specialist"; "Canine Surgery." The Solicitor was authorised to institute a prosecution in this case if proper evidence is obtainable.

N.95.—"Specialist in Chiropody, Dentistry and Canine Ailments." This matter was referred to the Solicitor with a view to obtaining further evidence.

Correspondence.—Correspondence was submitted and the Secretary's replies were approved.

On the motion of Mr. J. Willett, seconded by Mr. G. H. Livesey, the report was received and adopted.

Mr. J. Willett: I beg to move that the Seal of the College be attached to the prosecution authorised.

Mr. G. H. Livesey seconded the motion, which was carried.

On the motion of Mr. G. H. Livesey, seconded by Major Abson, the Council went into committee to complete the consideration of certain registration cases.

On resuming the sitting as a Council, the Secretary read the report of the second meeting of the Registration Committee, held on October 5th, and of the adjourned meeting, as follows:—

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Case Against Member.

No. 2511.—Aston, W. F. Alleged breach of Bye-law 53 (iii).

Mr. W. F. Aston appeared in response to the summons of the committee on a complaint made against him that in contravention of Bye-law 53 (iii) he had so acted as to permit Mr. J. Kay, an unregistered person, under cover of his name to practise as a veterinary surgeon.

The complainant, Mr. R. P. Parsonage, was also present, and both parties were represented by solicitor and counsel. After hearing the evidence produced in support of the complaint and the defence made on behalf of Mr. Aston, the parties were asked to withdraw while the committee deliberated in private. The Solicitor summed up the evidence and it was thereupon resolved:—

(*a*) "That the committee find that the complaint made against Mr. Aston has been proved to their satisfaction."

(*b*) "That in the special circumstances the President be requested to intimate the decision of the committee to Mr. Aston and to inform him that, while the committee appreciate the circumstances which led to the occurrence complained of, they enjoin upon him the necessity of taking such steps as will prevent a recurrence of any such offence against the Bye-laws in future."

(*c*) "That the committee consider that the complainant was fully justified in laying the complaint before the committee and that he be thanked for the trouble and expense which he had undertaken."

The parties were thereupon recalled and the President intimated the committee's findings to Mr. Aston and to Mr. Parsonage.

Mr. Aston at once gave a verbal undertaking that there would be no future cause for any similar complaint to be made.

Adjournment.—In view of the late hour, the committee adjourned until 2.15 p.m. on Friday, October 6th, 1933.

Adjourned Meeting, Friday, October 6th, 1933.

Cases Against Members.

No. 2338A.—Publication of article in *Farmer and Stockbreeder* advising laymen how to perform veterinary operation. A letter of explanation was received from this member, which was considered unsatisfactory in view of the undertaking he had given to the committee at its meeting on January 10th, 1929, that he would refrain from doing anything which would further the unskilled treatment of animals.

It was resolved "That this member be called upon to appear before the committee at its next meeting on a charge of conduct disgraceful to him in a professional respect within the meaning of Section 6 of the Veterinary Surgeons' Act."

2503.—Member. Alleged advertising. Correspondence was submitted in this case and the Secretary was instructed to inform the member that the Bye-laws of the College prohibit advertising in the lay press in the manner complained of and that the offence must not be repeated.

2510.—Member. Alleged incorrect certificate of soundness. This member did not appear and the case was considered in his absence. The Secretary was instructed to communicate with the complainant to ask whether he would be prepared to appear before the committee to substantiate his complaint, in which event the Secretary be authorised to summon the member to attend the next meeting of the committee on a charge of conduct disgraceful to him in a professional respect within the meaning of Section 6 of the Veterinary Surgeons' Act.

2513.—Walker, J. P. Police court conviction. The Secretary submitted a report from the Edinburgh City Police to the effect that on April 13th, 1933, this member was convicted on a charge of being under the influence of drink to such an extent as to be incapable of having proper control of a motor car, and that he was fined £15 or 30 days' imprisonment. The Secretary also reported that on May 22nd he had written to the member asking for his observations on the matter to lay before the committee and that as he had received no communication from Mr. Walker he had reminded him on July 11th and again on September 25th, but that Mr. Walker had made no reply.

It was resolved "That the Secretary be instructed to inform Mr. J. P. Walker that the committee take a serious view of his offence and that if any similar report should be received in future it will be their duty to take action under the powers conferred upon them by Section 6 of the Veterinary Surgeons' Act."

2515.—Member. Conduct. Police court evidence. An explanation by this member was submitted which was accepted as satisfactory.

On the motion of Mr. R. Hughes, seconded by Mr. G. H. Livesey, the report was received and adopted.

On the motion of Professor G. H. Wooldridge, the Council went into committee to consider the question of the payment of the expenses of a complainant in certain cases.

Parliamentary Committee.

Mr. J. Willett read the following report of the meeting of the Parliamentary Committee held on October 4th, and moved that it be received and adopted:—

Appointment of Chairman and Vice-Chairman.—Colonel J. W. Brittlebank was re-appointed Chairman, and Mr. J. Willett Vice-Chairman of this committee for the ensuing year.

In the absence of Colonel Brittlebank, Mr. Willett was appointed to the chair.

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Slaughter of Animals Act.—(*a*) The Secretary submitted a copy of the Slaughter of Animals Act passed into law on July 28th, and drew attention to the provision made in Clause 7 for "any Medical Officer of Health or any Sanitary Inspector duly appointed by a local authority to enter any slaughterhouse or knacker's-yard to ascertain whether there has been any contravention of the provisions of the Act." This provision had been made by a late amendment to the Bill drafted after reference to the Public Health Act, 1875, Section 116, with the consequence that the words "Veterinary Inspector" were omitted. The Secretary was instructed to write to the Ministry of Health expressing the regret of the Council at the omission, and expressing the hope that in any similar legislation in future proper provision be made for the recognition of the standing of the Veterinary Inspector.

(*b*) A letter was received from Captain A. W. Noel Pillers with regard to the interpretation of Clause 3 of the Act, which provides that no animal may be slaughtered in a slaughterhouse or knacker's-yard by any person who is not licensed by the local authority. It was resolved "That no action be taken."

South Africa Veterinary Act.—The Secretary submitted a copy of the regulations made under the South Africa Veterinary Act, 1933, submitted by the Dominions Office.

The Law Relating to Veterinary Practice.—A request was received from the Privy Council for information as to the law governing veterinary practice in this country, for the information of the Government of Mexico. The Secretary submitted a draft memorandum in reply, which was approved.

Reorganisation Commission for Milk.—The Secretary read a resolution received from the Southern Counties Veterinary Society regarding the Report of the Reorganisation Commission for Milk.

Major Arson seconded the motion and the report was adopted.

Library and Publication Committee.

Mr. G. H. Livesey (Chairman) read the following report of the meeting of the Library and Publication Committee held on October 6th, and moved that it be received and adopted:—

Chairman and Vice-Chairman.—It was resolved that Mr. Livesey be appointed Chairman and Dr. Sheather Vice-Chairman of this committee for the ensuing year.

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Librarian's Report.—The Librarian reported that during the past quarter 142 volumes had been sent out on loan, of which 58 were books and 84 were periodicals. Of these, eleven items had been lent to the National Central Library, six to the Medical Research Council, 13 to the Imperial Bureau of Animal Health, and 25 to the London School of Hygiene and Tropical Medicine. Four volumes had been borrowed for members from Lewis's Library, and one from the National Central Library. The following purchases have been made: Carr-Saunders: "The Professions"; Marshall: "Physiology of Farm Animals"; War Office: "Animal Management," 1933; Bradbury: "Causal Factors in Tuberculosis."

The Librarian's report was approved.

Presentations.—The Librarian reported that during the past quarter the following presentations had been made: By A. G. Lawson: Haycock's "Horses, How they Ought to be Shod"; By Bayer, Ltd.: Bach's "Die Mikroskopische Diagnostik der Tropenkrankheiten"; By A. J. Moffett: Wood's "Treatise of Farriery," 1757; White's "Farriery," Vols. i-iv, 1817. In addition, 25 annual reports, four year books, together with a large number of pamphlets, reprints and dissertations, and the usual periodicals.

It was resolved "That the thanks of the Council be conveyed to the respective donors."

Purchases.—The Librarian was authorised to purchase Leighton's "Pocket Handbook for Meat Inspection," 6s.

Duplicate Volumes.—A request from Dr. Campbell, of Chicago, for duplicate copies of *The Veterinarian* was left in the hands of the Librarian, with authority to supply such duplicates as could be spared from the Library, at a charge to be approved by the Treasurer.

Register.—The question of the publication of the Register for 1934 was referred to a sub-committee consisting of the Chairman and Vice-Chairman, together with Mr. Holroyd, Mr. McIntosh and Colonel Walker, with authority to carry out the work.

Library Endowment.—The question of the provision of an endowment fund for the Library to enable it to supply a more complete and efficient library service was considered, and it was agreed to request the Chairman to lay before the Council the reasons which, in the opinion of the committee, made it desirable that a public appeal for funds should be issued.

Colonel G. K. Walker seconded the motion, which was carried.

The President: I will now ask Mr. Livesey to lay before the Council the reasons which make it desirable that a public appeal for funds should be issued.

Mr. G. H. Livesey: The Library Committee has had the question of the formation of an endowment fund before it for some little time, and now feels in a position to put the reasons at which it has arrived before the Council and to ask the Council for their serious and favourable consideration.

The Library contains a unique collection of literature on all subjects relating to animals in health and disease. This literature has been gathered during the last hundred years, and consists of books, monographs, periodicals and reports from all parts of the world. These are available to be sent out on loan to scientific workers and practitioners, and provision is made for study in the Library itself. No other institution can satisfactorily supply this kind of service, because no other possesses so many complete sets of British and foreign veterinary periodicals. The Library is one of the Select National Libraries whose resources are indicated in the World List of Scientific Periodicals. It acts also as an outlier to the National Central Library, and in this capacity its contents are made available for students in any part of the British Isles. Not only has the Library been of immense assistance to those engaged in the study and investigation of animal disease in this country, but visitors from overseas are becoming increasingly aware of its value to them.

The Library has hitherto been maintained by such grants as the Council have been able to provide from their general funds, supplemented from time to time by small sums received from other sources, notably the Carnegie Trustees. The total income from the present small endowment fund is less than £100 per annum, which, of course, is subject to tax. It has, however, become more and more evident within recent years that, if the Library is to continue the services demanded of it and to meet the growing needs which the awakening of public interest in animal diseases has engendered, the endowment fund will have to be increased to provide an annual income commensurate with those needs, which is estimated by the committee at a minimum of about £500 a year.

It is for those reasons that the Library Committee recommend that the Council should consider whether it would be advisable to issue an appeal for contributions from those interested in veterinary and medical science, public health and agriculture for the creation of an endowment fund. The Library Committee put this matter in my hands to bring it before you in the hope that the Council would accept this suggestion and take the responsibility for the matter on itself, and arrange for an appeal fund at as early a date as possible. I shall be glad to answer any questions, if members of the Council wish for further information.

Dr. A. L. Sheather: For obvious reasons I feel a little diffident in supporting what Mr. Livesey has said with regard to getting funds for the Library, but my colleagues will know that I have no axe to grind in this matter. It is obvious that a library is utterly useless and mere lumber if it cannot be used, and no library can be used if it is not organised. It is to organise our Library and thus bring it into a condition where it can be used that funds are very urgently required.

The President: I take it the desire is that the Council should adopt the principle that an appeal should be made: is that it?

Mr. Livesey: Yes, Sir. If the Council will first of all adopt the suggestion that a public appeal be made, then when that is agreed to we can get to work.

The President: You wish to move that as a motion?

Mr. Livesey: If no discussion is desired first, I should like to propose that the Council adopt the suggestion of the Library Committee, and that a public appeal be made for funds for an endowment of the Library.

Mr. Hughes: I beg to second that.

The President: Does any member wish to say anything on this? The necessity for this seems obvious to all, and if no one else has anything to say I will put the motion.

The motion was carried unanimously.

Mr. Livesey: Now that the Council has adopted that, my suggestion is that the Council itself should form the Appeal Committee to carry out the work. Obviously the appeal must come from the whole College and must have the support of every member of the Council, and, I hope, of every member of the profession throughout the country. The Council of this College, I take it, must be actually responsible for the appeal. It may perhaps not be able, however, to carry out the details of the work, and I would suggest that the Council appoint a small executive committee to organise a plan and prepare an appeal which can be put out to the public, and to report from time to time what they do in the matter..

The President: There is thus a further motion, that the Council itself constitute the Appeal Committee and appoint a small executive committee to carry out the work of the appeal. Is anyone prepared to second that?

Dr. Sheather seconded the motion, which was carried unanimously.

The President: Do you propose to carry your scheme further at the moment, Mr. Livesey?

Mr. Livesey: May I suggest an executive committee?

The President: If that is the wish of the members. I think the Library Committee are anxious to see this matter pushed forward.

Mr. Livesey: I suggest the President, the Treasurer, the Chairman and Vice-Chairman of the Library Committee and the Chairman and Vice-Chairman of the Finance Committee, with power to co-opt.

The President: Does that mean power to co-opt from the whole body of the profession, or only from this Council? This is to be a very general and public appeal, and I take it that in an appeal of this kind you might want to co-opt prominent members of the profession who are not members of this Council.

Mr. Livesey: I think that is a matter for the Council to decide. Perhaps they may not be able to come to a decision on that at present. One does not quite know where that might end.

The President: There is a further motion by Mr. Livesey, therefore, that the executive committee consist of those he named, with power to co-opt, leaving it at that for the moment.

Lieut.-Colonel P. J. Simpson (Treasurer): Would three months' delay hurt? It seems to me, although I am completely in favour of it, that this has been brought forward rather quickly, without any notice on the agenda paper or anything else to give time for the consideration of the matter. I would suggest that it might be brought forward again at our next Council meeting, appearing on the agenda and thus giving many members who are not here at the moment time to think it over and discuss it.

The Secretary: That would be done in the normal procedure.

Lieut.-Colonel Simpson: But we are electing a committee which not every member of the Council knew would be appointed.

The Secretary: We have appointed the Council a committee, and the Council as a committee will receive particulars of what is proposed. At its meeting in January the Council, sitting as an Appeal Committee, will receive the plans proposed by the executive committee, so that the three months' delay will take place in any case.

Mr. Livesey: It was the idea of those who have discussed this matter that it would be very desirable to get the appeal out in the earlier part of next year, perhaps in April or May. We want plenty of time to organise this appeal thoroughly and to make up our minds to whom and how we are to appeal. We must do it well or not do it at all; it must be a success or it must be dropped.

Lieut.-Colonel Simpson: I presume the cost of the appeal would fall on the Royal College and not on the Library.

Professor Wooldridge: It is the Royal College which is issuing the appeal.

The President: I take it that what we are doing now is this. We have approved of the principle and we are appointing a small committee to get on with the work, but of course nothing will actually be done without a report being made to this Council. Does that meet your point?

Lieut.-Colonel Simpson: Yes.

The motion was carried unanimously.

Appointment of Local Secretaries.—The President: I think it is advisable for the Council to go into committee to make these appointments.

The Council went into committee and, on resuming the sitting as a Council, Professor

Wooldridge moved, that Mr. A. K. Cameron be appointed Local Secretary in Edinburgh, Mr. James Doyle in Dublin and Mr. J. M. Mitchell in Glasgow.

Professor Whitehouse seconded the motion, which was carried.

A ballot was taken for the election of a Local Secretary in Liverpool and, as a result of the ballot, Mr. R. S. White was declared duly appointed Local Secretary in Liverpool.

Appointment of Reserve Examiners.—The President: The Examination Committee recommend that this be deferred for the time being.

Walley Memorial Prize Regulations.—The President: We will take next the question of authorising the sealing of an application for the revision of the Walley Memorial Prize Regulations.

The Secretary: We have made an application to the Charity Commissioners for an alteration in the conditions for the award of that prize, and they require the Seal of the College to be attached to that request.

Professor Wooldridge: I move that that be done.

Mr. G. H. Livesey seconded the motion, which was carried.

Future Procedure in Electing a President and Two Vice-Presidents.—The President: It may save going into committee if I make the suggestion that for the consideration of future procedure in electing a President and two Vice-Presidents the whole Council should sit as a committee at the Quarterly Meeting in January next. I do not know if that meets with your approval.

Major Dunkin: I was going to propose that, in view of the fact that less than half the members of the Council are present, and that this is perhaps—in my opinion, certainly—the most important item on the agenda to-day, it would be unwise, if not improper, to discuss this point this afternoon. I should like to move, if you will allow me to do so, that this item be struck out, and that you permit me to give notice of motion at the next meeting, to allow all the members to have information as to what is to take place. My motion would be before the members at that meeting. If that meets with the approval of my colleagues, I am prepared to do that.

The President: Would not that involve so much delay that it might not be ready before July of next year?

Major Dunkin: It would mean that, yes.

The President: I think we should be in a position to know what we are going to do when we come to elect another President and two Vice-Presidents in July, and the reason why I suggested that the whole Council should sit as a committee at the January meetings, perhaps on the Wednesday or Thursday of that week, was in order that they might discuss the matter then in committee. I should like to hear what others think.

Major Dunkin: I am greatly obliged to you, Sir, for that suggestion, but I do not know whether you want to press it, for the reason that I have given, namely, that so few of us are now present and it is an important matter. In the light of your reminder that my own proposition would mean too long a delay—with which I entirely agree—allow me to suggest that this matter be put on the agenda for the Council meeting in January.

The President: That is practically the same thing as my own suggestion.

Major Dunkin: Then I am sorry; I misunderstood your suggestion. If you mean that this item, which has been placed on the agenda for to-day, should be placed again on the agenda for January, then I am in entire agreement. Is that what you mean?

The President: Practically, except that I thought we might have a special meeting on the Wednesday or Thursday of the week in which we meet in January.

Major Dunkin: To discuss this point? That would suit me very well.

Professor Whitehouse: You do not mean to nominate a President?

The President: No. Underlying my suggestion is that everybody should have a chance to state his views on this in January. It should not merely be left to a committee, but we should all have an opportunity of expressing our views by a special meeting of the Council, sitting as a committee, being held to consider this point on the Wednesday or Thursday.

Professor Craig: I want to be quite clear whether what is going to be considered is the future procedure in electing a President and two Vice-Presidents or whether you mean that at that meeting to consider the election of those officers.

The President: The procedure relating to it. The proposal is that a special committee be appointed for this purpose and that the committee consist of the whole Council.

Professor Share-Jones: What that committee will be doing, I take it, is this: it will be considering whether or not what was ruled as a Standing Committee last year should be continued, or whether some new procedure should be adopted. The ruling given last year was that that was a Standing Committee.

The President: Is the suggestion I have made agreed?

The Council agreed.

The Quarterly Meeting of Council then terminated, and the Special Meeting was held.

SPECIAL MEETINGS OF COUNCIL

A Special Meeting of Council of the Royal College of Veterinary Surgeons was held at 10, Red Lion Square, London, on Friday, October 6th, 1933, at 5 p.m., immediately following the termination of the Quarterly Meeting. Professor S. H. Gaiger, President, occupied the chair, and the same members were present.

The minutes of the previous Special Meeting, which had been printed and circulated, were taken as read and signed as correct.

Mr. J. Holroyd: I beg to move that Bye-law 62 be amended as follows: "In paragraph 2 delete all words after 'taken' in line 4 and insert in their place the words 'as part of the second examination.'" This is a purely formal matter.

Professor Wooldridge seconded the motion, which was carried with one dissentient.

The Secretary: The next motion stands in the name of Professor Buxton. As he is absent, perhaps the President might move it in his name.

The President: I will move Professor Buxton's motion, that Bye-law 110 be amended as follows: "Delete the second paragraph."

The Secretary: The second paragraph of Bye-law 110 says: "In Group I there shall be two Examiners, and in Group II three Examiners, but in no case shall a teacher of a subject act as an Examiner of his own students." It causes great difficulty, and in actual fact the Council have not appointed three Examiners and did not appoint three Examiners because they found that the Bye-law would not work. It has therefore been proposed that that second paragraph be deleted.

Professor Whitehouse seconded the motion, which was carried.

Professor Whitehouse: I beg to move: "That Bye-law 11 be amended by the insertion of the words 'June or' before the word 'July' in lines 6 and 8." If anyone wants to know what that means, I can explain it.

Professor Craig seconded the motion, which was carried.

It was agreed to hold the confirmatory meeting on Wednesday, October 18th, at 3.30 p.m.

The proceedings then terminated.

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Confirmatory Meeting.

At the confirmatory meeting there were present Professor S. H. Gaiger (President) in the chair, Messrs. J. Holroyd, G. H. Livesey, G. H. Locke, Dr. A. Leslie Sheather, Lieut.-Colonel P. J. Simpson, Colonel G. K. Walker and Professor G. H. Wooldridge.

The minutes of the previous Special Meeting were read and signed as correct.

Letters of apology for absence were received from Major Abson, Mr. Dodd, Mr. Dolan, Major Dunkin, Mr. Hughes, Mr. McIntosh, Major Mattinson, Mr. Nairn, Captain R. Simpson, Major Spreull, Dr. Whitehouse and Mr. Willett.

Bye-laws.—The following alterations to Bye-laws passed at the Special Meeting held on October 6th were confirmed:—

(*a*) That Bye-law 62 be amended as follows: In paragraph 2 delete all words after "taken" in line 4 and insert in their place the words "as part of the second examination."

(*b*) That Bye-law 110 be amended by the deletion of the second paragraph.

(*c*) That Bye-law 11 be amended by the insertion of the words "June or" before the word "July" in lines 6 and 8.

Common Seal.—The Common Seal of the College was ordered to be affixed to the Bye-laws as altered.

N.V.M.A. Divisional Report

SOUTHERN COUNTIES VETERINARY SOCIETY

MEETING AT BOURNEMOUTH

A meeting of the Southern Counties Division, N.V.M.A., was held at the Museum of the Bournemouth Natural Science Society on Friday, September 15th, 1933.

The President, Captain J. F. D. Tutt, F.R.C.V.S., occupied the chair, and there were also present Messrs. N. S. Barron, E. F. Beckett, W. Caudwell, John Facer, Bernard Gorton, R. E. Klyne, E. S. Martin, C. Pack, J. H. Ripley, J. T. Turney, G. N. Gould, J. B. Tutt, J. S. Wood and J. B. White, Hon. Secretary, together with Dr. Leslie Sheather and Messrs. Arnold Spicer and W. E. Beckett as visitors.

The minutes of the last meeting, having been published in the *Record*, were taken as read.

Apologies for absence were received from Sir Frederick Hobday, Lieut.-Colonel P. J. Simpson, Messrs. E. R. Harding and H. C. Rockett.

Election of Members.—On the proposition of Mr. J. H. Ripley, seconded by Major E. S. Martin, Mr. N. S. Barron, of Reading, and Mr. R. W. Down, of Andover, were elected as members.

Correspondence.—The Hon. Secretary reported that he had received letters from the Central, Western Counties, Lancashire, and Lincolnshire Veterinary Societies acknowledging his letter containing the resolution and recommendations of the last meeting, together with the drafts of similar recommendations passed by them. He had also received a letter from the Secretary of the N.V.M.A., acknowledging the resolution, and stating that the Reorganisation Commission for Milk were instructed to prepare, within the

provisions of the Agricultural Marketing Act, 1931, a scheme for regulating the marketing of milk, so that it could not be foreseen that their recommendations would extend to the veterinary inspection of dairy cattle. Had there been any hint that the Commission were considering questions directly affecting the veterinary profession, the Council would have offered to obtain, and present, the views of the profession.

The Hon. Secretary said he also had a letter from the Secretary of the R.C.V.S., acknowledging the resolution, and, in reply, stating the same facts as in the previous letter, while at the same time asking if any members of the Society foresaw that veterinary evidence would be of use to the Commission.

To this letter he had replied in the negative, as he did not think members had foreseen that point.

The Secretary of the R.C.V.S. then wrote that as the Society did not foresee that, he thought the resolution, which read like a vote of censure on his office and on the Council, should be withdrawn.

The Hon. Secretary then said that he did not think the resolution was intended as a vote of censure on any individual.

Mr. G. N. Gould remarked that this was especially the work of the Council and one could not expect individual practitioners to have knowledge of all these things.

Major Martin thought the first letter was merely an explanation of why no action was taken, and with regard to the second, it was never intended to pass censure on anyone.

The President said he did not think that could be inferred.

Mr. Gould further remarked that he understood the N.V.M.A. had arranged for Parliamentary agents to keep them posted regarding all Parliamentary proposals likely to affect the profession.

Mr. Caudwell suggested that they waited until they heard from the Council officially.

Mr. Gorton said he would be inclined to adhere to the resolution.

Mr. Gould agreed, and suggested that the Hon. Secretary should write, and point out that the Society's letter was not intended as a vote of censure, but that they felt it was a resolution which should be brought before the Parliamentary Committee.

It was eventually agreed, however, to take no further action and that the resolution should stand.

Next Meeting.—It was unanimously decided to hold the next meeting at Salisbury in December, the actual date being left to the President and Hon. Secretary.

This concluded the business of the meeting, and the President invited Dr. Sheather to give his paper on "The Control of Johne's Disease."

[Dr. Sheather's paper is reproduced, together with a report of the ensuing discussion and the essayist's reply, elsewhere in this issue.—Ed., *V.R.*]

The President proposed a hearty vote of thanks to Dr. Sheather for his kindness in coming down and giving them such an interesting address and also for the ready way in which he had answered the questions put to him. This was seconded by Major E. S. Martin and carried by acclamation.

Mr. W. Caudwell then exhibited *post-mortem* specimens, the first being a case of hyperthyroidism in a puppy, the thyroids being extremely enlarged.

He had been asked to destroy this puppy, but a litter brother which showed similar symptoms rapidly improved with the internal administration of iodine.

The second exhibit was a number of renal calculi found on the *post-mortem* of a bitch which had died only a few hours after being seen for the first time, and which at that time showed signs pointing to kidney trouble.

The President thanked Mr. Caudwell for bringing forward these interesting specimens.

[A fuller account of these cases appears in our Clinical Sections this week and next.—Ed., *V.R.*]

Tea was now served, and before the members separated Major E. S. Martin asked Mr. Bernard Gorton to convey their thanks to the Bournemouth Natural Science Society for the use of their Museum for the meeting. They were also indebted to Mr. Gorton himself for introducing them to such an excellent meeting place.

Mr. Gorton replied that he was sure the Society were only too pleased to have them there and there was no reason why they should not always come there when they met in Bournemouth.

J. B. White, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

Nov. 13th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

Nov. 17th.—Annual Meeting of the North Wales Division, N.V.M.A., at Rhyl.

Aug. 13th-18th, 1934.—Twelfth International Veterinary Congress, New York.

CENTRAL VETERINARY SOCIETY'S "VICTORY" MEDAL

PRESENTATION, IN HOSPITAL, TO MR. HENRY GRAY

An announcement was made by the President (Mr. Cyril P. King) at the Annual Dinner of the Central Veterinary Society—an account of which will shortly appear in our columns—which gave the utmost pleasure to the company. It is the custom of this Society at this function to present its "Victory" Medal to the member who, in the opinion of the Council of the Society, has done most to earn the approbation of his fellow members, and the President announced that the choice this year had fallen upon Mr. Henry Gray. It was a matter of the deepest regret to them all, he proceeded, that Mr. Gray was unable, through ill-health, to be present that evening to receive the medal at his hands, but the assembly would be glad to learn that the presentation had been made in the hospital where Mr. Gray was unfortunately compelled to lie.

We learn that officers of the Society visited the West London Hospital on Tuesday of last week and presented the "Victory" Medal to Mr. Gray, who expressed his gratification both at the honour accorded him by his fellow members and the kindly thought which prompted the presentation of the medal in hospital.

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PERSONAL

Veterinary Officers on Leave.—The following Colonial Service Veterinary Officers are on leave: Messrs. G. B. Purvis (Federated Malay States), R. L. Creery (Kenya), H. Gamble (Leeward Islands), R. Coulthard and R. Dunwoody (Nigeria).

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Appointment.—The appointment is announced of Mr. E. G. Prentice, M.R.C.V.S., of Coylton, by Ayr, who graduated at Glasgow in July, as Veterinary Officer, Nigeria.

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Colonial Veterinary Scholarships. — Messrs. K. D. S. MacOwan, Aberdeen, and D. S. S. Nicholson, Oxford, have been selected for Colonial Veterinary Scholarships. Holders of these Scholarships will, subject to vacancies being available, normally be offered appointments in the Colonial Service after completing satisfactorily their course of training.

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ROYAL SOCIETY AWARDS

One of the two Royal Medals awarded this year by the President and Council of the Royal Society is given, we are glad to learn, to Dr. P. P. Laidlaw, F.R.S., for his work on diseases due to viruses, and particularly that on human influenza. Many members of the profession have had the privilege of hearing Dr. Laidlaw, with his colleague, Major G. W. Dunkin, discourse at veterinary society meetings on the progress of the canine distemper investigation at Mill Hill.

Veterinarians both in this country and in the New World will learn with particular pleasure that among the medal awards made by the President and Council is that of the Copley Medal to Professor Theobald Smith, lately Director of the Department of Animal Pathology of the Rockefeller Institute of Medical Research, Princeton, New Jersey, U.S.A., for his original research and observation on diseases of animals and man.

Dr. Theobald Smith enjoys world-wide fame as an authority on comparative pathology, and is the author of frequent and highly-valued contributions to the *Journal of Experimental Medicine*, published by the Rockefeller Institute. A treasured recollection of those who were present at the Royal (Dick) Veterinary College Centenary Celebrations in November, 1923, is the delivery of a masterly address by Professor Theobald Smith on "Comparative Pathology: Its Biological and Economic Significance."

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R.C.V.S. OBITUARY

DUNN, William, Shandon Lodge, Vicar's Cross, Chester; "Existing Practitioner." Died October 17th, 1933, aged 81 years.

The Cheshire Observer of October 21st records that the residents of Vicar's Cross and Tattenhall in particular, received with regret the announcement of the death of Mr. William Dunn, who formerly practised as a veterinary surgeon in Tattenhall and the surrounding area, before settling, on retirement, at Shandon Lodge, Vicar's Cross, Chester. Mrs. Dunn predeceased her husband eleven years ago, and he leaves one surviving of two sons.

"A native of Tarporley, the late Mr. Dunn as a boy went to the Old Grammar School, Bunbury. He was son of the late Mr. William Dunn, F.R.C.V.S., who had a big practice in Tarporley and a wide district round. During the cattle plague his services were naturally greatly in demand and valued. When his father died, the subject of this notice went to Tattenhall, where he practised for 25 years as a veterinary surgeon, and became generally known and respected. In 1906 he retired, and had since lived a quiet life at Shandon Lodge. He kept his old horse and governess car to the last, and residents of Vicar's Cross will remember him by his custom, in which he highly delighted, of driving out in it in the neighbourhood. The late Mr. Dunn's grandfather, also named William, used to train horses and ride for the Shropshire celebrity, John Mytton, whose 'hunting, racing, shooting, driving and extravagant exploits' are recorded in a well-known book, by 'Nimrod.'"

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NEALE, Duncan, of High Street, Sherstone Magna, Wilts.; "Existing Practitioner." Died November 2nd, 1933.

For more than 30 years Mr. Duncan Neale lived with his brother, Moses, and neither of them married.

On the death of his brother, eleven years ago, however, he made the most minute arrangements for his own burial, including the erection of a tombstone recording family deaths, and with an inscription (to be completed) relating to his own, and married almost immediately.

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WALL, Arthur, of Ludlow. Graduated London, May 17th, 1892; died October 14th, 1933, aged 67 years.

In an appreciation, *The Coleshill Chronicle* of October 28th says: "With the death of Mr. Arthur Wall, at the age of 67, a link which was forged about 36 years ago between him and Coleshill has now been broken. He was well-known and highly-respected by all Coleshill.

"He was born at Shustoke and, after graduation as a veterinary surgeon, he worked under Mr. Dale, of Coventry. He was a keen sportsman, who interested himself in the social welfare of Coleshill, and was one of the promoters of the Coleshill Charity Football Cup. He was for many years secretary of the Coleshill Cricket Club, and was also captain of the Coleshill Bowling Club, captain of the local Fire Brigade, and one of the instigators of the Old Folks Treat in Coleshill at Christmas time.

"He will be remembered for his work on the Coleshill Parish Council, of which he was Chairman for a considerable time. By his efforts he quickly won his way into the hearts of the Coleshill people.

"He left Coleshill for Ludlow in 1919. His value to the townspeople there was soon discovered, and he was made an alderman of the council of that borough. He often renewed his acquaintance with Coleshill.

"His passing is deeply regretted by his numerous friends locally."

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BRICK KILN FUMES ACTION

Failure of Claim for Loss of Cow.

Fumes from the Rossmore Brick Works' kilns were alleged by Charles Henry Bishop, of Alder Farm, Branksome, to have been the cause of the death of a cow and calf, but at the Bournemouth County Court, on October 25th, he failed in an action for £40 5s. damages against William Thomas Burden, the proprietor, His Honour Judge Hyslop Maxwell giving judgment for the defendant.

Plaintiff alleged that the value of the cow was £30, that the calf was worth £5, and that the veterinary surgeon's fees were £5 5s.

Plaintiff said he had been farming Alder Farm for four years. On May 29th he noticed that a cross-Guernsey cow was running at the eyes, and after they got her back from the fields a veterinary surgeon was sent for. On May 26th and 27th he noticed that fumes were coming across his land. He had noticed them before, but not to the same extent. The foliage of trees was "burnt" and blackened.

He told defendant the fumes had affected the cow's eyes. Defendant was alleged to have offered £10, but plaintiff said he could not take that because he did not think it would pay the veterinary surgeon's expenses.

The calf was born dead on May 29th, and the cow died on June 9th. Plaintiff took the certificate of the *post-mortem* examination to defendant. The following Tuesday evening plaintiff went to see defendant again and he said he would not discuss the matter any further.

Mr. Edward George Robertson, the veterinary surgeon who attended the cow, said that on May 29th, he noticed the swollen eye-lids and the profuse running of both eyes. On June 8th the cow had developed gangrenous pneumonia. He noticed distinct evidence of the foliage of the trees on the farm having been "burnt," and when they were touched the leaves crumbled to pieces. When they interviewed Mr. Burden, Junr., he told witness that his pony had been affected by the fumes and he treated him with castor-oil himself.

In cross-examination witness said this was not actually a case of poisoning, but in his opinion the cow's condition was set up by irritant fumes.

Dr. George William Clough, Professor of Chemistry and Toxicology at the Royal Veterinary College, said that after seeing the certificate and hearing the evidence his opinion was that the cause of the cow's death was inhaling an irritant gas which was sulphur dioxide. Having seen the foliage on the plaintiff's farm, his opinion was that it was killed by sulphur dioxide.

A large amount of research had been done, and the result shewed that 50 parts of sulphur dioxide and one million parts of air were sufficient to injure animals. It definitely would do so if the animal were exposed to the fumes for half an hour.

His Honour: I cannot understand why all the cows in the neighbourhood were not killed.

Witness said the explanation was that it was only on this occasion that it reached that high concentration. Atmospheric conditions might be another reason.

It had been shown that a composition of one hundred parts of sulphur dioxide and a million parts of air did kill leaves.

His Honour: Are leaves so much stronger than the organs of a cow?—Well, that is the result of research.

Witness said the symptoms described by the veterinary surgeon and as seen on *post-mortem* were exactly those which were present in sulphur dioxide poisoning.

In cross-examination, witness said that a high concentration of the fumes would cause injury to the organs of the animal, and the condition would get progressively worse. There were cases on record of horses lasting up to ten days afterwards.

For the defence, Thomas Burden said the kiln in question had been there for 45 to 50 years. He had never had any complaints from other farms. When Mr. Bishop complained of the smoke making his cow, which afterwards died, ill, he still denied that the fumes were the cause, but because Mr. Bishop said he did not know how he would keep up his milk supply, he offered him £10 to settle the matter, out of sympathy with the man. In cross-examination, he agreed that other brick kilns near his had shafts to carry off the fumes, but his had never had shafts.

Major John Stewart Wood, M.R.C.V.S., said he had practised as a veterinary surgeon at Poole since 1899, and he had known Alder Farm for over 20 years.

Mr. Brandreth (defending): During that time has there ever been any suggestion of danger from the brick kilns?—I have never heard of it.

Witness said that he thought there was no doubt this cow died from septic pneumonia. He added that during the Great War, whilst he was stationed on the Western Front, 40 horses which were suffering from gas poisoning were sent to him. The military authorities very much wanted a *post-mortem* examination made if any of them died, but none of them died, and he had two shot for this purpose.

Another expert witness, Major William Stothert, M.R.C.V.S., of 7, Cavendish Road, Bournemouth, said that all the symptoms of the *post-mortem* examination pointed to ordinary, every-day septic pneumonia, which probably began with a cold and was aggravated by milk fever and the presence of the dead calf.

He thought it would not be possible for an animal to inhale the fumes of brick kilns and for these to cause its death, at a distance of 100 yards.

Frederick John Burden, 44, Victoria Road, Branksome, son of the defendant, said that no complaints whatever had been received during the 40 years he had been at the brick-works. The fires of the kiln were lighted on May 24th and put out on Saturday morning. It was not working on Saturday afternoon or Sunday. He and another man were working part of the time on top of the kiln amongst the fumes. Since the complaint they purposely put a horse in the fumes to see what would happen. It suffered no ill-effects at all. Farmers' cows had been around the brick-works for the past 30 years. With regard to the alleged effect of the fumes on a crop of potatoes, witness said that about 30 years ago there was a discussion upon the point and it turned out to be caused by blight.

His Honour said that, having listened to all the evidence, plaintiff had quite failed to satisfy him that the cow died from the effects of an irritant poison from the fumes of the kiln. Judgment was given for the defendant with costs.

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LONDON QUARANTINE STATION

The Ministry of Agriculture announces that the question of the continued maintenance of the London Quarantine Station for exported pedigree stock formed the subject of a conference which was held at the offices of the Ministry of Agriculture between representatives of the breed societies, representatives of the Royal Agricultural Society, which has hitherto administered the quarantine station, and officials of the Ministry. As a result the representatives of the Royal Agricultural Society of England and the breed societies agreed to appoint a committee to examine financial and other details in consultation with representatives of the Ministry and to report to a subsequent conference.

[The station was provided by the Empire Marketing Board in 1928 and since then has been operated at small cost by the Royal Agricultural Society on behalf of the breeders of pedigree stock. The Ministry of Agriculture has assisted by providing the official veterinary inspection requisite for the assurance of oversea buyers. From the records of the station it appears that about 2,500 head of stock, valued at £163,000, have undergone quarantine there in preparation for shipment to South Africa, Australia, and other Empire countries, to the mutual advantage of stock breeders in this country and oversea.]

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ROYAL AGRICULTURAL SOCIETY

Sir Merrik Burrell, Chairman of the Veterinary Committee of the Royal Agricultural Society, speaking at a recent meeting of the Council of the Society, made reference to the report by the Central Public Health Committee of the London County Council concerning the possible infection of bulked supplies of milk by milk from tuberculous cows.

To allow the statement to go forward without comment might unduly alarm the public. It was now the practice for milk to be transported to London and other large cities in tanks of a capacity of 3,000 gallons, and it might be possible for the bulk of the contents of a tank to be infected by a very small quantity from a tuberculous cow. But it must be realised that, before it was distributed, the milk was either pasteurised or sterilised, so that the public was safeguarded so long as the pasteurisation was done efficiently. It would be very unfortunate if the impression became widespread that because the milk was bulked it arrived at the consumer's door infected with tuberculosis. This aspect of the milk supply was now being considered by the Economic Advisory Council.

The Council of the Society decided to offer its medal for distinguished service to agriculture to Sir Thomas Hudson Middleton, as its first recipient. Sir Thomas was Assistant Secretary to the Board of Agriculture from 1906-19, Deputy Director-General of the Food Production Department from 1917-19, and Professor of Agriculture at Cambridge from 1902-07.

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Errata.—It is regretted that the name of Mr. W. Norman Thompson instead of that of Captain W. K. Townson, of Peterborough, was erroneously given in the list, published in our last issue, of those elected to the Council of the Central Veterinary Society at the Annual General Meeting held on October 12th.

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Mr. C. Weighton, M.R.C.V.S., writes: "In reference to my statements regarding the cooling of carcasses prior to freezing, reported in *The Veterinary Record*, No. 44, Vol. xiii, page 1124, col. 2, para. 2, of the 4th inst., a better interpretation of my remarks would be obtained by the elimination of the words 'from drying,' at the end of the last sentence."

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R.S.P.C.A. HEADQUARTERS DISPENSARIES

In an issue of *The Animal World* (the official organ of the R.S.P.C.A.), it is reported that during the three months, June 26th to September 25th, there was a marked increase in the number of animals dealt with at the London dispensaries. There is evidently, it is stated, an increasing demand by the public for the facilities of professional treatment now offered by the Society.

At the opening of the Bethnal Green Dispensary on October 12th, Mr. Seymour, the Chairman of the recently formed Bethnal Green Branch of the Society was supported by Major-General Sir John Moore, Colonel Commandant of the Royal Army Veterinary Corps, K.C.M.G., C.B.E., F.R.C.V.S., the Mayor of Bethnal Green, Councillor C. Bennett, Captain Pulleine, the London Regional Organiser, R.S.P.C.A., and Captain MacCunn, the Assistant Secretary.

In his opening speech, Mr. Seymour referred to the successful inauguration of the Branch in the Borough and appealed for support.

The Mayor, in a valuable address, referred to the necessity of the Dispensary in such a crowded and poor district, and condemned Club Row Bird Market in the strongest possible manner.

Captain MacCunn, in moving a vote of thanks to the Mayor, included in the vote of thanks others prominent locally in the movement, who numbered amongst them Mr. W. S. King, M.R.C.V.S., who is giving his services at the dispensary without charge.

Major-General Sir John Moore, in seconding the vote of thanks, referred to the value of the Society's work to the Royal Army Veterinary Corps, of which he was Director-General during the War, and gave some very interesting personal reminiscences of the intelligence of animals.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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DOG BISCUITS AND HYSTERIA

To the Editor of The Veterinary Record

Sir,—The opinion has been frequently expressed that there may be some connection between canine hysteria and the biscuits, or biscuit meals, given to dogs.

In order to investigate certain aspects of this, we are making a series of analyses in my department of different biscuits, and I am anxious to obtain samples of as many kinds as possible. May I, therefore, appeal through the *Record* to

practitioners to send me samples, half-a-pound being sufficient, of the biscuits used in their districts? I should be very grateful for any assistance in this respect.

Yours faithfully,

R. G. Linton.

Department of Hygiene,
Royal (Dick) Veterinary College,
Edinburgh, 9.

November 6th, 1933.

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BOVINES AND ACETONE EXCRETION

To the Editor of The Veterinary Record

Sir,—Professor Boddie's report on the investigation of the urine of normal dairy cows is an interesting and useful contribution to veterinary literature.

I have long held the opinion that acetone excretion is a normal phenomenon of bovines: the typical sweet smell of the byre is simply the odour of acetone and, to my mind, does not indicate pathological processes. This smell can be appreciated in any closed space in which bovines are enclosed. The breath of dairy cows, particularly, smells of acetone and not by the greatest stretch of imagination can one construe this as indicating deviation from normal health. If Professor Boddie investigates the breath of bovines, no doubt he will find acetone in greater quantities than in their urine.

Some of our colleagues read medical literature and thereupon persuade themselves that they can discover something in animals which is analogous to a condition described in humans. They are invariably impressed by high-brow dissertations which are often the vapourings of a dreamer's mind not understood by the dreamer, his readers, or anyone else. Theories, syndromes, complexes are freely quoted. As one who tries to keep pace with current medical literature, good and bad, I am often at a loss to follow the arguments contained therein. After reading of some extraordinary condition in humans, I am suspicious when I hear or read of a similar state of affairs in the animal world. The paraphrasing of the original article and preparation thereof is apt to swamp the veterinarian's good common sense.

Professor Boddie is to be congratulated in that he starts at the right end for a veterinarian, *i.e.*, by investigating the animal.

Yours faithfully,

J. McCunn.

Royal Veterinary College.

November 5th, 1933.

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THE ART AND SCIENCE OF MINDING ONE'S OWN BUSINESS

To the Editor of The Veterinary Record

Sir,—The letters from Mr. Mayall and Mr. Hall Masheter have put the present position of the veterinary profession in a nutshell, and the rôle of those who accept a whole-time appointment is made abundantly clear in all the recent advertisements of such posts and is emphasised by Mr. Hall Masheter in italics in concluding his letter. This wording has certainly "put me off" applying for any of these posts, as although a good many County Medical Officers of Health interpret it as "in collaboration," the majority, I am certain, would interpret it in the terms of the appointment.

I am in favour of collaboration with the medical profession, but not to come under its supervision and control: and unless the veterinary profession realises the dangers, as exemplified by the behaviour of the Grigg Commission, it will rapidly become its underling.

At the recent Congress, an attack led by a medical man armed with statistics (which, carefully handled, can be made to prove anything), was made on the profession, for using a living vaccine to control abortion in herds where other measures were futile. Whilst not denying that there may be a risk to the human subject from infected milk, I consider that it is practically negligible, and it would be interesting to know if those who are alleged to have contracted undulant fever from drinking milk from abortion-infected cows were Hebrews, or total abstainers from pork. I decline to believe that if this risk to the human subject, or on the alleged subsequent fertility of the cow, was as great as alleged, so many eminent practitioners would have overlooked it, and have carried out this inoculation on thousands of cattle for several years past, and still do so.

There is strong evidence on all sides of an insidious campaign in favour of pasteurised milk. The medical view favours it because even milk from diseased animals, etc., can then be taken with relative safety (we know now that it is much altered in this process): and as to the dealers' views, some of these, it has been credibly stated, are "all out" for pasteurisation, an important reason being that pasteurised milk *keeps so much longer;* in fact, it has been stated that the bottle of pasteurised milk delivered on your doorstep may on occasion be seven days old—and what organisms originally there, or introduced extraneously, have grown during that, or a shorter, period? And it may then be re-pasteurised. It is no doubt on account of these latter possibilities that many medical men insist on the *boiling* of all milk, as pasteurisation, of course, does not sterilise it, and may even leave live, though attenuated, bovine tubercle organisms in it. The most ardent disciple of pasteurised milk cannot surely allege that it is superior to clean raw milk, especially to young children. The Auchincruive, and Rowett Research Institute experiments do not support this view.

The Ministry of Health might, with advantage, prohibit the holders of Grade "A" (T.T.) licences from keeping a herd of reactors, as it does not require much stretch of the imagination to know from whence a shortage of milk in the tested herd is made good when this occurs.

I am afraid that the medical profession, having failed to solve many of its own problems, is seeking to divert its energies into a purely veterinary field. Having signally failed for generations to solve the problem of cancer, through studying it from the pathological instead of the biochemical aspect (when it would have been solved long ago), it is leading a scare about milk.

Yours faithfully,

J. F. D. Tutt, F.R.C.V.S.

1, St. Cross Road,
Winchester.

November 5th, 1933.

The Editor acknowledges, with thanks, the receipt of the following:—

Report of a meeting of the Lincolnshire and District Division, N.V.M.A., from Mr. H. C. Reeks, junr., Hon. Secretary.

Communications from Mr. W. Collinson (Sheffield), Major T. Dalling (Beckenham), Lieut.-Colonel A. G. Doherty (The Curragh), Mr. R. E. Glover (Cambridge) and Mr. A. Spicer (Oxted).